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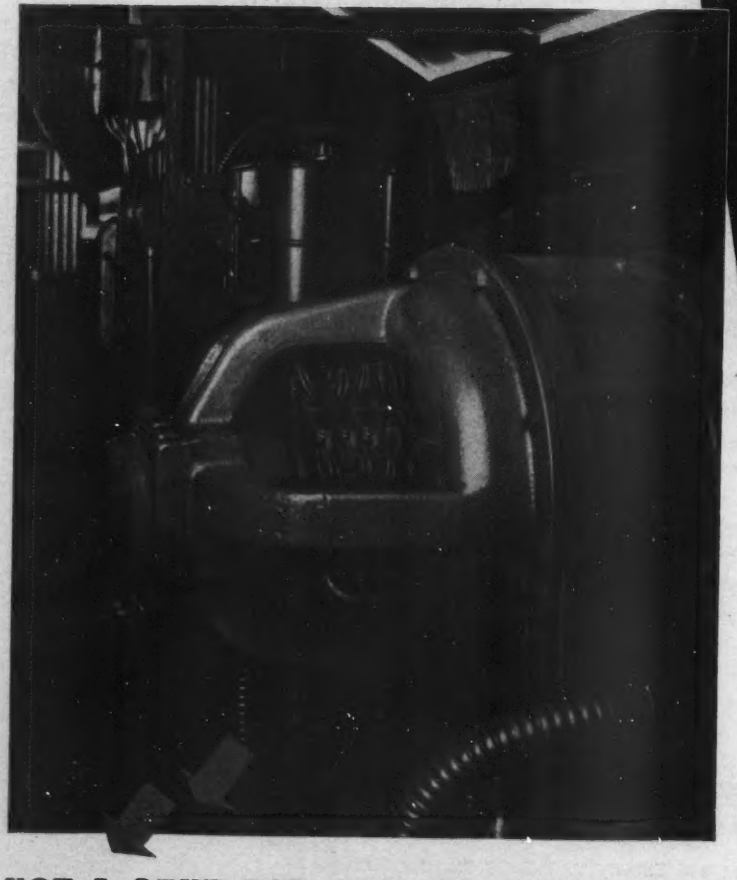

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Control and Safety Equipment for Drilling

in California Proven and Wildcat Areas

By
Wallace A. Sawdon
Petroleum Engineer, Los Angeles

"An ounce of prevention is worth a pound of cure" is an understatement when it comes to drilling an oil well. Blow-outs are far too costly to be considered as even possibilities if there is any chance whatever of eliminating such possibilities. Control gates and blow-out preventers have therefore become standard equipment on wells drilling in all California fields and wildcats where any flowing pressures can be expected. For a long time "pressure drilling" has not been practiced except for completion operations and then almost entirely where the completions have been made with oil as the circulating fluid. Heavy mud has been relied on to offset formation pressures with surface equipment providing the necessary control when gas-cutting, agitation, weight depletion or other causes endanger drilling operations.

The mud fluid serves more purposes than the control of pressure but the conditioning of the mud fluid by admixtures and chemicals and a consideration of characteristics other than weight will be discussed in a subsequent article. Since pressure-drilling technique or any sustained drilling under pressure in California is at the present time confined to completions after the final casing string has been cemented, this subject also will be treated in a later article which will be confined to a discussion of well completion methods.

In spite of the great depths penetrated in several fields, excessive mud weight has not been found necessary under normal drilling conditions. In some cases mud weight up to 100 lbs. per cu. ft. and even more has been used to meet specific conditions but the average for deep drilling and through high pressure formations at shallower depths is probably around 80 lbs. per cu. foot. In the Rio Bravo field, for instance, where wells are completed at approximately 11,500 ft., the mud weight ranges from 75 lbs. to 82 lbs. with the general average for most of the hole approximately 78 lbs. per cu. ft. At Wasco, the deepest field in the state, 76-lb. mud is circulated for normal drilling but in a high pressure formation lying between 6000 and 7000 ft. the weight is sometimes increased to 95 lbs. At Greeley the weight usually carried ranges around 76 lbs., but when shale trouble necessitates a heavier fluid the weight is generally raised to 80 lbs. Some operators drilling at Coalinga Nose use 75-lb. mud while others employ a fluid as high as 82 lbs. Probably the heaviest mud used in recent years weighed 116 lbs. per cu. ft. but this was employed in a tight formation and the heavy mud was circulated to hold back the shale formation until casing had been run, not to offset formation pressure.

The pressure exerted by a column of mud fluid of specified weight at

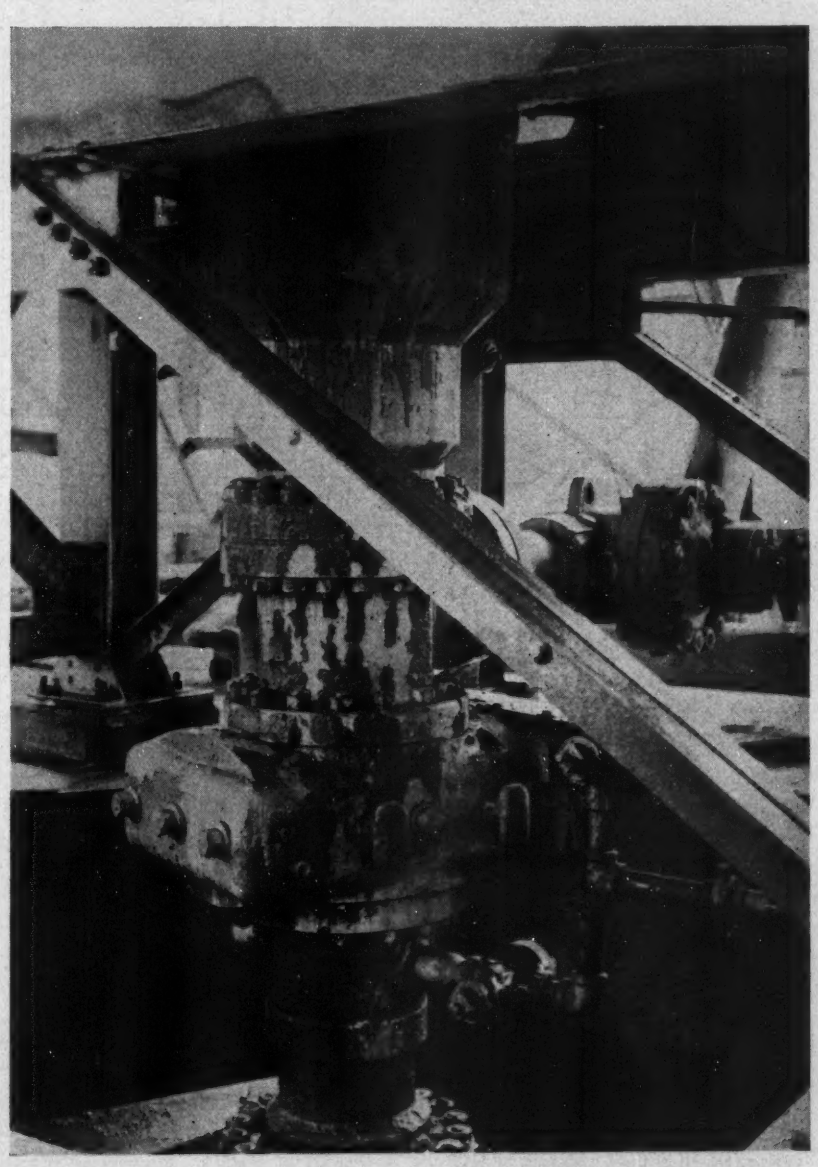
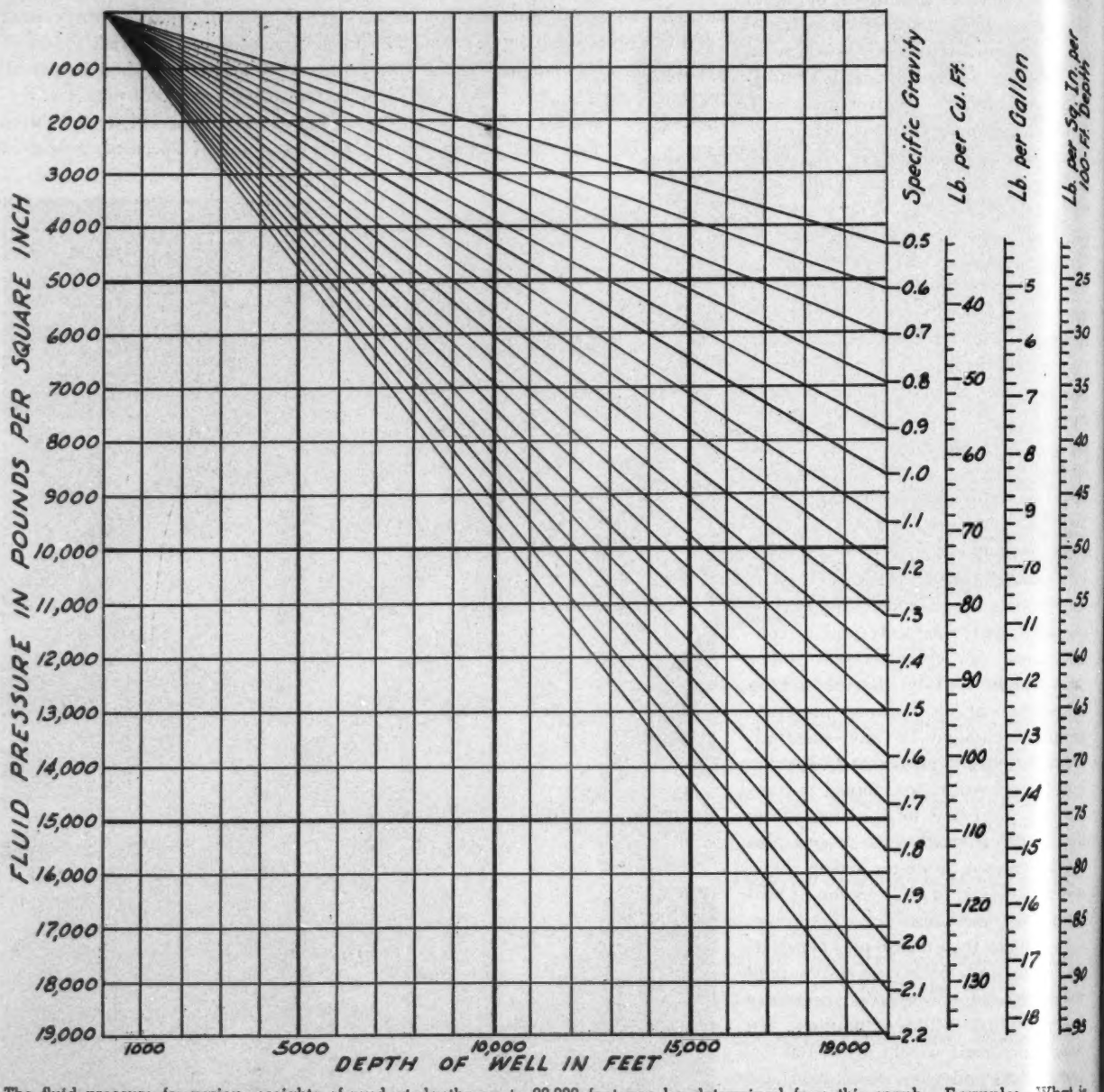


Plate 1. A blow-out preventer is here set above a complete shut-off cellar control gate.

various depths up to 20,000 ft. can be readily determined by the graph given in Fig. 1. The scale to the right of the graph is provided to facilitate use of the chart whether the weight is designated in "pounds per cubic foot," "pounds per gallon" or "pouuds per square inch per hundred feet of depth." Considering the 95-lb. mud sometimes used at Wasco at 7000 ft., the pressure exerted at this depth is 4600 lbs. per sq. in. This same weight fluid at 13,000 ft. (just above the completion depth) would be 8500 lbs. A 76-lb. mud at this 13,000-ft. depth would be 6800 lbs. which, with proper control equipment at the surface to meet any contingency arising from a lightened mud, has been found adequate for the pressures encountered.

Native clay is widely used in California for the base mud to which weight material is added when a mud heavier than the native mud is necessary. The average weight of mud made of native clay is approximately 75 lbs. per cu. foot. Characteristics other than weight are, of course, given consideration in mixing mud but as far as weight alone is concerned, addi-



The fluid pressure for various weights of mud at depths up to 20,000 feet can be determined from this graph. Example: What is the pressure exerted by mud weighing 94 lbs. per cu. ft. (approximately 12.6 lbs. per gal.) at a depth of 11,000 feet? Using the scale to the right, 94 lbs. per cu. ft. mud is found to have a specific gravity of 1.5. Follow the diagonal line for a specific gravity of 1.5 until it intersects the vertical line indicating a depth of 11,000 feet. This point is just below the horizontal line reading 7000 on the scale to the left and thus indicates the fluid pressure to be 7100 lbs. per cu. in. Weights lying between specific gravity diagonal lines require interpolation. Mud weighing 90 lbs. per cu. ft. (12 lbs. per gal.) has a specific gravity between 1.4 and 1.5 and by interpolating between the diagonals for these two specific gravities, the pressure at 11,000 ft. is found to be 6800 lbs. per sq. in. If a fluid pressure of 9000 lbs. is wanted at 13,000 ft., the reverse procedure is followed and it will be found that a mud weighing 100 lbs. per cu. ft. will be necessary.

tional weight to meet the demands of the job is secured by the addition of whatever weight material may be necessary.

Drilling Control Hook-Ups

In general, the safety hook-ups used during drilling in the California fields consist of, from bottom to top, a landing base; landing heads for casing strings within the surface string; a complete shut-off gate or master valve; a gate for shutting off around pipe or a blow-out preventer; and a control head. Mud outlets for returns may be incorporated in the control head, in the blow-out preventer or in a connecting nipple which is sometimes located between a lower master gate and the blow-out preventer above. Variations in the type of equipment and in the hook-up itself are governed by the preference of the operator and many include a mud cross below the full closing gate as a means of relieving pressure for making connections to the mud pumps in case of emergency. In all fields where any danger of blow-out is at all likely, the minimum equipment used includes a full closing gate and a means of closing around the pipe which may be in the hole when a blow-out becomes imminent.

Safety considerations, however, start before the control equipment is placed on the well. Subsurface pipe is, wherever feasible, cemented from top to bottom. In some cases, particularly with long surface strings, the lower portion is cemented around the shoe and the upper portion by pumping slurry from the top through tubing run into the annular space between the pipe and the wall of the hole. Complete encasement of the pipe by forcing cement around the shoe until returns reach the surface of the ground is being given more thought, however, and some operators are considering the use of equipment that permits placement of the cement through tubing with provision against back flow of the cement.

This first string of casing with its landing base has to support each subsequent string and to it is attached the equipment which must provide control of the well. The importance of the surface string and its landing base is evident but there have been cases where improperly cemented surface strings have permitted blow-outs around the casing to the surface when the actual hook-ups shut the well in completely. The selection of the casing point is thus of considerable importance and the most satisfactory bond possible should be provided for the cement around the shoe.

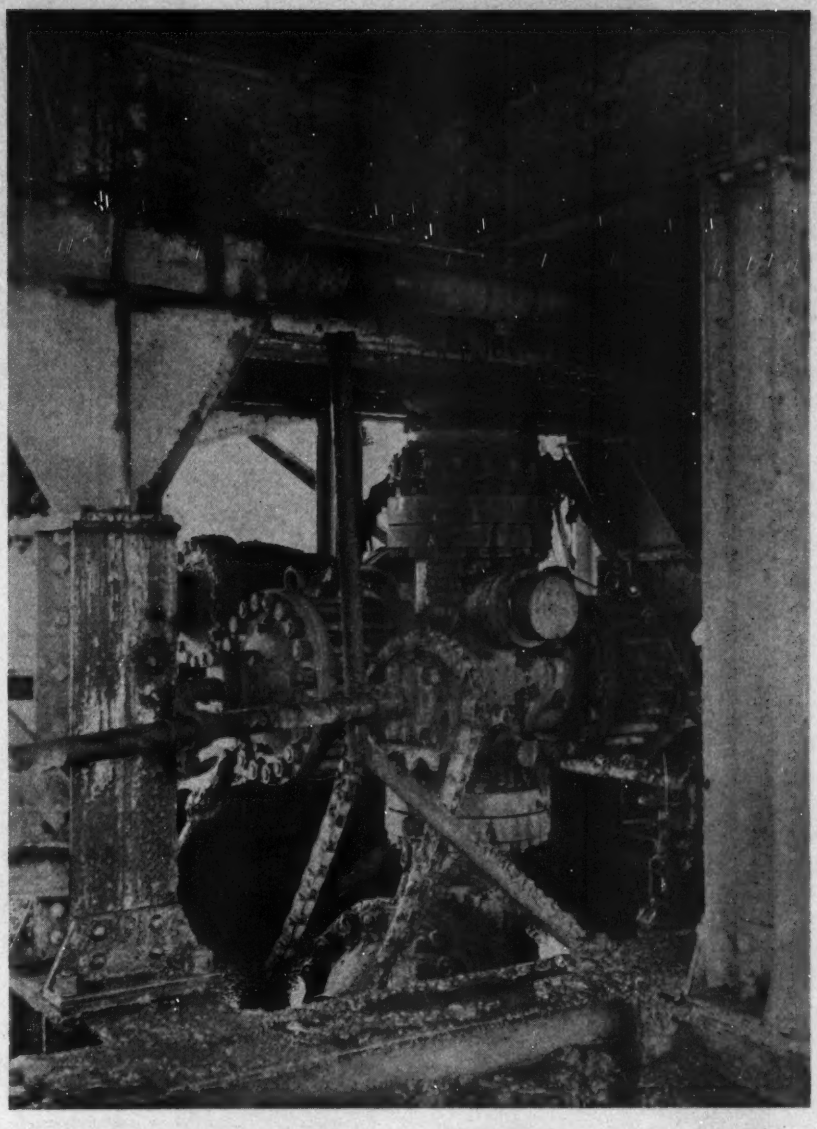


Plate 2. This pressure operated blow-out preventer set above a manually controlled drilling valve is a recent installation in the Rio Bravo field.

A combination landing base and head is frequently used for the first two strings of casing and with a two-string program is the only landing head used. This saves head-room since the whole assembly is no higher than the head alone. For three or more strings this combination base and head with one or more heads for other strings or a separate landing base and two or more heads are used. The spool type head is widely employed above the landing base and frequently, when the casing program can be planned in advance, all the heads can be placed as soon as the landing base has been set. This is done by using full opening heads that have the same internal diameter as the surface string and are designed for the insertion of guides of proper size to take succeeding strings. With this arrangement the drilling connec-

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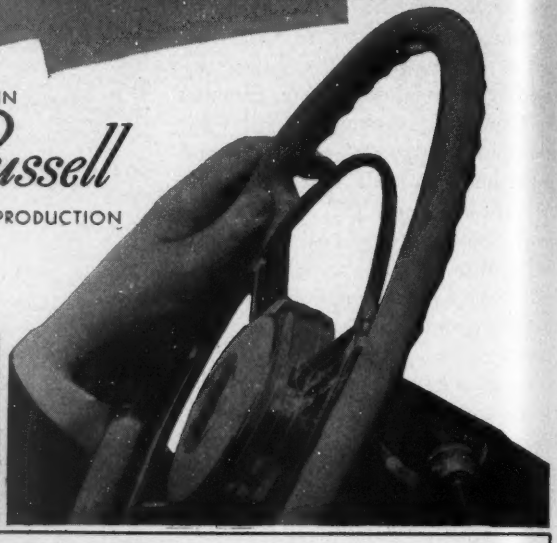

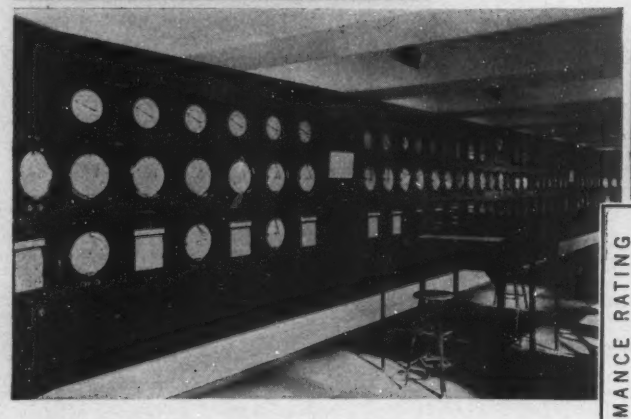

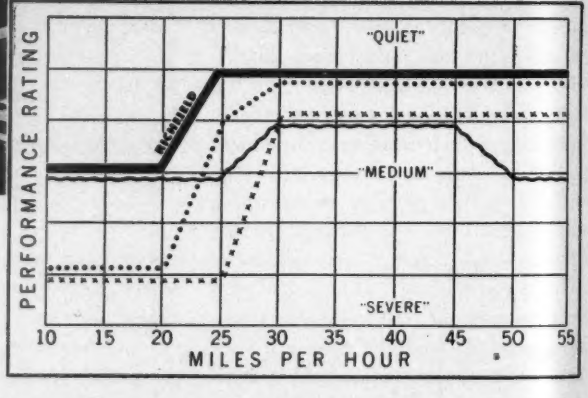

"HOW IS RICHFIELD ABLE TO MAKE A GASOLINE SO OUTSTANDING?," asked Henry Fonda after he saw it out-perform all other gasolines of his choice in his own car. We explained that in the West's newest and finest refinery (control room shown above) can be produced any type of gasoline sold today — BUT no other refinery is able to duplicate the "years-ahead Richfield."

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A gate closing engine operating cellar control gates on a well in the Montebello field. The well is on a hillside and a platform was built on the slope to accommodate the engine.

tions need not be changed in size or length.

After a string of casing has been landed and cemented it is, of course, necessary to remove the control equipment to set and pack it in the landing head. Since this work is done before the cement has been drilled out there should be no danger from blow-outs while the control equipment is off the well. At this time the operation of the equipment should be checked over carefully to make sure that it is functioning in every detail. Much of the control equipment, such as gates or any parts that must be moved in case of trouble, should also be tried out at least every day. This is particularly important with equipment that is exposed to mud fluid which might cause clogging of mechanical parts. More than one blow-out has occurred because equipment has been used for a long time without even an inspection or any thought of keeping the moving parts in condition although the ready functioning of the parts was the one thing for which the equipment was installed.

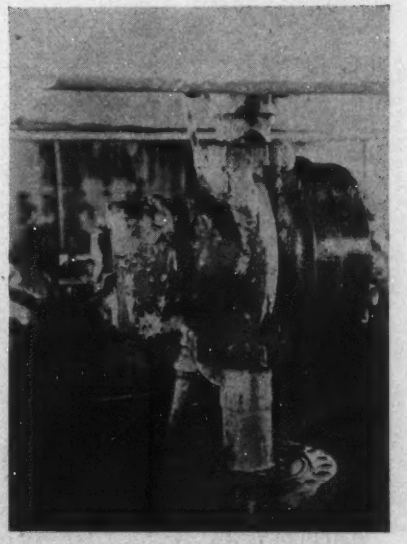
Maintenance of well head equipment is greatly facilitated by the high derrick floors which are being used by many of the companies. While the eight-foot height is now common in several fields, one company is placing the drilling floor 11 ft. above ground. Some companies still use the low floor with small deep cellars which make the packing off of casing and all work relative to operation and maintenance of the cellar control equipment inconvenient. Greater safety also attends the use of high floors but remote control of gates or blow-out preventers that require operation when a blow-out threatens is, as ever, most desirable if not absolutely necessary.

Remote Control

To make safety equipment consistent, remote control is actually necessary and it is practically universal practice to operate gates and blow-out preventers from a point distant from the cellar, whether the closing and opening of equipment is manual, through application of pressure or by other devices. Manually controlled gates are operated through torque rods consisting of 2-in. or 2½-in. tubing connected to the operating screws by universal joints. These rods are turned by large hand wheels usually placed beyond the derrick floor so that danger is eliminated when closing the gates in cases of emergency. Remote control with pressure is peculiar to different types of pressure operated equipment and is later described in conjunction with the various kinds of blow-out preventers being used in California.

During the past year a gate closing engine has been developed to replace manual operation of gates. This engine is set up at any convenient place, usually just beyond the derrick at approximately the ground level, and is connected to the gate by a torque rod (lazy rod) coupled at the gate and at the engine with universal joints. The engine, shown in an accompanying photograph, consists of a turbine with forward and reverse operation controlled by a three-way valve. The turbine rotor shaft is connected through 4-to-1 speed reducing sprockets and chain to a countershaft which thus increases the power at the torque tube four times that at the rotor shaft.

This equipment operates the gate much faster than manual control with a hand wheel. The turbine is designed for operation with steam from the boiler plant but can also be operated with water at slightly less acceleration. As the power required to close the gate varies under different conditions, a fly ball governor is used to regulate the speed. Impact lugs on the countershaft provide sufficient impact to jar loose tightly set gates or valves or to hammer a gate closed when conditions make closing difficult.



Seven-inch round opening drilling through valve on a Continental Oil Co. well in the deep Wasco field.

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Gates and Blow-Out Preventers

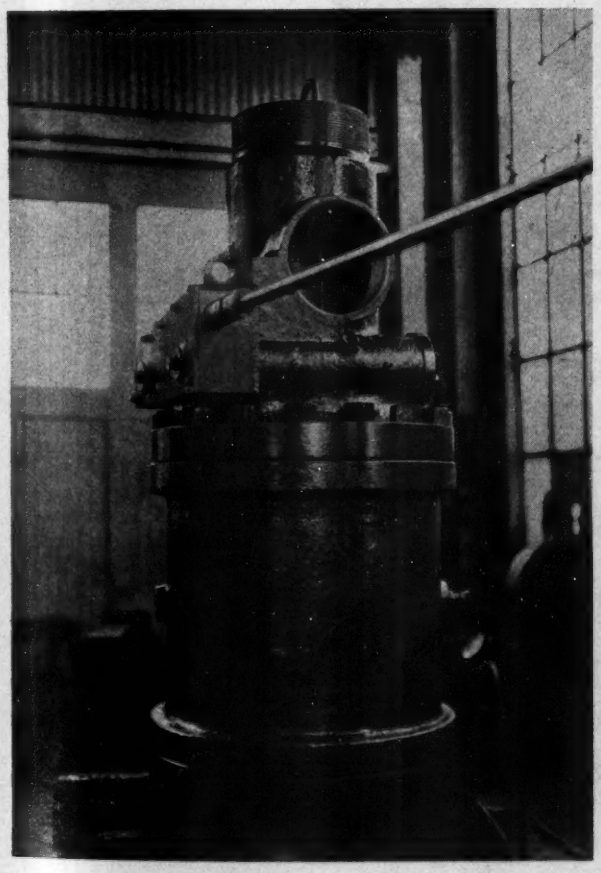
There are several rather typical hook-ups being used in the various California fields and a number of these are shown in the accompanying illustrations. On some a control head is placed above the equipment shown in the photographs and with many of these control heads some form of the Hosmer type packing with lip ring is used. This type of blow-out preventer installed above the other control equipment provides a secondary seal. In one design, the packing assembly is split vertically, the halves being hinged together, and is provided with a latch device for locking around the kelly or drill pipe. The assembly is equipped with handles and is suspended on a line in the derrick and thus kept convenient for use. When an emergency arises the packing assembly is swung into position around the kelly or pipe and lowered into the body. With other designs the blow-out packing assembly is inserted into the head when a blow-out threatens.

Plate 1 shows a pressure controlled blow-out preventer above a manually operated control gate which is equipped with rams for making a complete shut-off when the pipe is out of the hole. The mud flow line leads off from a flow line spool located between the blow-out preventer and the gate and is equipped with a manually operated valve.

This type blow-out preventer contains a rubber packing unit through which is a full-open passage of the same size as the diameter of the casing to which it is attached. The rubber packing is continued in a contractor piston with an internal taper at bottom that moves vertically in the body of the preventer. When a blow-out threatens, pressure is applied to a chamber below the piston which is then moved upward. As the piston rises, the internal taper compresses the rubber inward to seal around the drill pipe or kelly.

With the rubber packing unit set around the drill string, the pipe can be lowered to bottom or the kelly can be raised. The seal is effective around square, hexagonal or octagonal kellys as well as drill pipe. Tool joints are stripped through the rubber packing under pressure and the drill string to the bit can be pulled out of the hole. With the string withdrawn until the bit is just below the blow-out preventer packing, the complete shut-off gate below is closed and the blow-out preventer may then be opened for withdrawal of the bit. The drill pipe can be rotated while packing off but when prolonged drilling under pressure is to be carried on a rotating type of blow-out preventer is used above the preventer illustrated. The rubber is under compression during the time it is packing off around the string.

The well pressure is admitted into



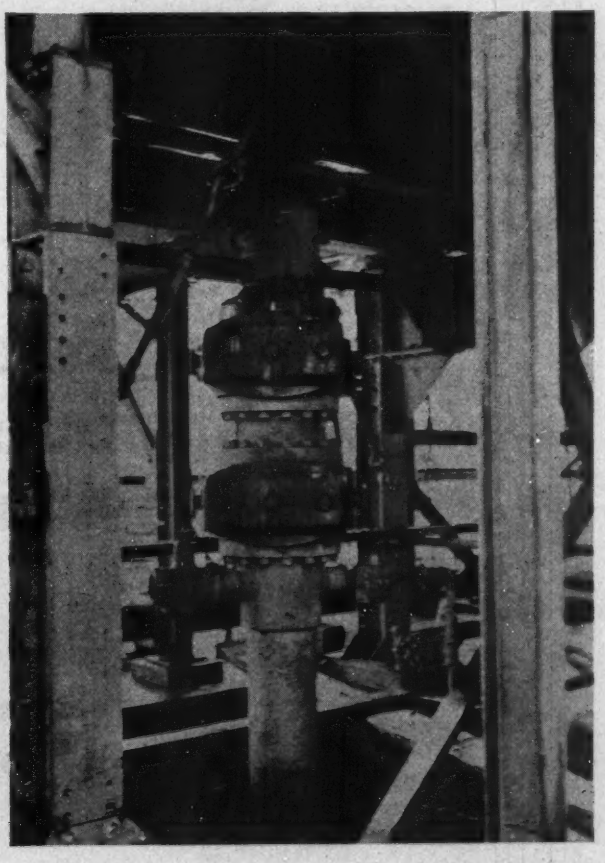


Plate 3. Left: This newly designed blow-out preventer has first been installed on a well in the Greeley field with a complete shut-off control gate like the one in Plate 1 set below it. Right: Plate 4. This hookup consists of two control gates, the top with rams to close around pipe, and the lower one with rams for complete shut-off.

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the control chamber and once the packing unit is compressed around the pipe or kelly the seal is automatically maintained as long as the well continues to exert pressure. Pressure for closing the rubber around the drill pipe or kelly is from some outside source such as the boiler feed pumps. The pressure is admitted to the chamber below the piston by an operating valve but when well pressure is great, fluid pressure is admitted to a chamber above the piston to regulate the pressure with which the packing unit is closed. This pressure above the piston is regulated by a controller valve which, together with the operating valve, is in a control manifold usually located on the derrick floor near the driller's position.

The cellar control gate shown in Plate 1 below the flow line spool provides for complete shut-off when pipe is out of the hole. The gate is equipped with a ram assembly consisting of two operating screws, two ram block holders and two ram blocks with rubbers. When the gate is being closed the rams are moved toward each other synchronously by means of the operating screws which are themselves given synchronous rotation by a chain drive connecting the screws. Turning of the screws is done with a hand wheel placed beyond the derrick and connected to the end of one screw of the control gate by a torque tube with universal joint.

The gate is closed when a blow-out threatens while the pipe is out of the hole and thus shuts the well in completely. If a well has been closed in by the blow-out preventer above while the drill string is in the hole and the string is to be pulled out while the well is still under pressure, the string is pulled up until the bit clears the control gate and the gate then closed.

The hook-up shown in Plate 2 consists of a pressure operated blow-out preventer with flanged flow line outlet and a manually operated gate valve below for making a complete shut-off of the well when pipe is out of the hole. The particular installation photographed provides remote control of the gate valve through a chain and sprocket since the valve itself is too low to accommodate the torque rod extending to beyond the derrick foundations. Some hook-ups using this type blow-out preventer are now being made up with a pressure operated gate valve below the preventer and another pressure operated valve on the flow line. Each of these has a single ram for full closing similar to the blow-out preventer rams described below.

While the closing mechanism of the blow-out preventer pictured in Plate 2 is controlled by fluid pressure, it can also be operated by independent manually operated ram closing and locking screws. When closed by fluid pressure the rams are also locked by locking screws. Pressure for operation is usually supplied by boiler feed pumps but a connection to the slush pumps is frequently made as an auxiliary source of pressure in cases of emergency. The feed pump pressure is naturally preferred when adequate or available since only clear water then enters the control manifold and blow-out preventer cylinders. The control mani-

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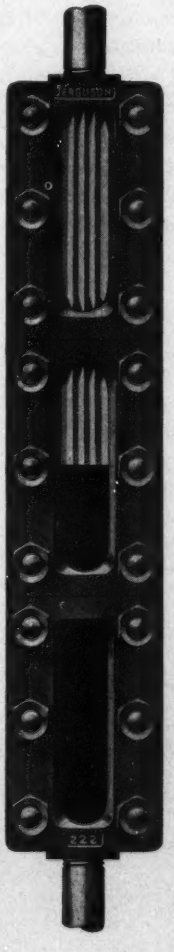

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fold is placed at a convenient position for operation when a blow-out threatens and, through a four-way valve, directs fluid pressure from the supply line to a closing line, opening line and exhaust line.

The rams of the blow-out preventer are round and are equipped with rubber which is forced completely around the pipe in the hole when the rams are closed. The two rams, on opposite sides of the hole, move simultaneously through a horizontal bore with equal movement under given pressure. The liquid pressure is admitted to a chamber behind a piston which moves each of the rams for closing and to another chamber behind a thrust ring on the piston to reverse the rams for opening. The thrust is along the longitudinal axis of the rams.

A new type of blow-out preventer has recently been designed and the first one is now in service in the Greeley field. This preventer, shown in Plate 3, includes a flow line connection in its upper member and the assembly has been placed above a ram-type cellar control gate like the one shown in Fig. 1 for complete shut-off when pipe is out of the hole.

The lower member of the blow-out preventer houses a hollow rubber cylinder with longitudinal indentations in its inner and outer surfaces which give it the form of a bellows. When a blow-out threatens, fluid pressure is applied through an inlet to behind the packer and causes it to clamp around the drill pipe or kelly. The fluid pressure is applied by water or oil from a separate pump placed outside the rig and controlled by a manifold convenient to the driller's position. Although the mud pumps can be utilized in case of emergency the mud has to be cleaned out of the housing and slots in the rubber after such use.

The blow-out preventer when open has the same internal diameter as the casing to which it is attached but will pack off around small drill pipe. Because of the large gap between the small drill pipe and the normal full opening of the packer in the lower member, the upper member has been designed to provide for bushings which will close this gap and insure effective pack-off around small pipe against high pressures. Without the use of bushings in the upper member, working pressures will vary with the size of the pipe being packed off. By using the bushings to close the gap, equally high pressure may be obtained on any size pipe within the specified range.

The bushings are made in two halves, are hinged and latched together and are held in place or released by rotation of a pair of shafts as shown in the photograph. These shafts are operated from outside the rig by means of a hand wheel and line shaft connected to a worm gear which operates both shafts through a chain and sprocket drive. The bushings are arranged so that they can be inserted after the rubber has been closed provided the pressure does not exceed 500 pounds. They are left in place while drilling and need only be withdrawn when the bit is changed.

When stripping a drill string through the blow-out preventer, the bushings are opened to permit passage of tool joints, rubber protectors, etc., the packing rubber of the lower member serving as the stripper. The upper end of this blow-out preventer is arranged to house a Hosmer assembly for additional protection when an emergency requires.

Plate 4 shows a hook-up consisting of two cellar control gates, the upper one equipped with rams to close around the pipe and the lower with rams for making a complete shut-off when the pipe is out of the hole. Above the gates is a flow line spool and above this, but not shown, is a control head into which a packing assembly may be inserted when a blow-out threatens.

The lower gate is the same as the one shown in Plate 1, the construction and operation of which has been described. The rams of the upper gate, similar in construction to the lower gate, are made to fit around whatever size drill pipe is in the hole, the rams being changed when a different size drill string is to be used or when a string of casing is to be run into the well. In case of danger when either the casing or drill pipe is in the hole, the upper gate is closed around the pipe. If the pipe is out of the hole when a blow-out is imminent, the lower gate is closed to shut off the hole completely.

Another type of blow-out preventer that has been used in California has three radial cylinders with cup-shaped rubber pistons which form the packers. In closing, the rubber pistons are operated by hydraulic pressure and contract around the pipe in the well. The hydraulic pressure expands the ends of the cup-shaped rubber packers and this provides a seal around the kelly or drill string. If necessary the string can be raised or lowered, or even rotated, to some extent.

General Features of Equipment

Gates and blow-out preventers using rams for closure around pipe are now generally available with self-centering types of rams because of the small size

Here, at Municipal Auditorium, Santa Barbara, Calif., the first annual Pacific Coast Liquefied Petroleum Gas Exposition will be held June 27 and 28. This interesting show will be sponsored by the Pacific Coast Section of the Liquefied Petroleum Gas Assn.

of drill pipe frequently used in large diameter casing and to overcome an uncentered hang of the pipe in the hole. These rams which provide proper alignment with the rubber faces of the rams are made with protruding angular guides. As the rams move toward their closed position the angular guides engage the drill pipe and move it into central position in the ram. The guides telescope into recesses on the opposite block to permit the abutting faces to seal around the string.

Practically all control gates and blow-out preventers are furnished with neoprene or other oil-resisting material. Rubbers are checked for deterioration and the design of equipment now being used provides for convenient replacements when the rubbers wear out or otherwise get into bad shape. Blow-out control equipment is something that has to perform its duty without notice and the experienced operator is keeping it in workable condition at all times.

Flange connections have become almost general for installations of control equipment in California and with the A.P.I. ring joint flanges now being provided the flange connections have been found adequate for any pressure encountered.

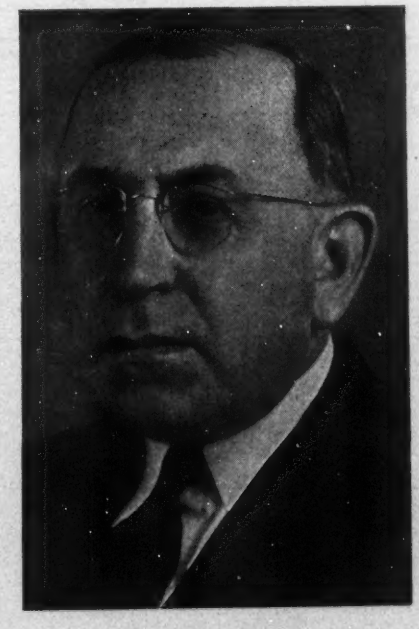
Drill pipe floats placed just above the bit are desirable for preventing flow through the drilling string in case of a blow-out but since most wells are periodically checked for verticality by means of the go-devil type of deviation recording instruments the use of drill pipe floats is not general. Kelly cocks provide a means of shutting off the flow through the drill pipe but from observation it seems that kelly cocks are not as widely used as would seem advisable. Operators make intelligent provision against flow around the drill string but rely on the rotary hose, standpipe and other connections to take care of any flow through the drill pipe.

Reed Goes to N. Y.; Rogers to Cooper-Bessemer

The Cooper-Bessemer Corp., maker of gas and diesel engines and compressor units, has recently announced that John

J. W. Reed

Rogers has joined its organization in a sales engineering capacity and will soon take up his duties as Pacific Coast manager at the company's Los Angeles offices. Simultaneously, the transfer of James W. Reed from the Los Angeles to the New York offices has become effective, with Mr. Reed being appointed Atlantic Coast manager of the corporation's Gas Engine and Compressor division.



John Rogers

Mr. Reed joined The Cooper-Bessemer Corp. in 1924 and was made Pacific Coast sales manager in 1929. He goes to New York with a wide experience in the application of the company's engines and compressors to petroleum, natural gas, and general industries power uses. In his new position, Mr. Reed will be in charge of gas engine and compressor equipment sales in the eastern seaboard area.

Mr. Rogers is a native of Ohio, having attended Ohio Mechanics Institute and Miami Academy. Moving westward, he enrolled at the University of Southern California and graduated from that institution's school of mechanical engineering in 1911. At its inception, he joined the Frank J. Kimball Co., an organization devoted to oil-field and irrigation engineering, and held the office of vice president and secretary. In 1916 he became affiliated with the Ingersoll-Rand Co. as engineer, with sales duties, in their western territory.

During the World War, Mr. Rogers served the Canadian government in a marine salvage engineering capacity. Rejoining Ingersoll-Rand after the war, he devoted his entire time to sales engineering work in the southwest, being later transferred to New York as manager of the oil-field equipment department, then assuming the management of the oil engine department. In 1933, he was appointed chief engineer of the oil-field division of the company, continuing in that position until recently resigning to join with Cooper-Bessemer.

Mr. Rogers' territory in his new affiliation will include the entire west coast. His headquarters will be the already well-established Los Angeles offices of The Cooper-Bessemer Corp.

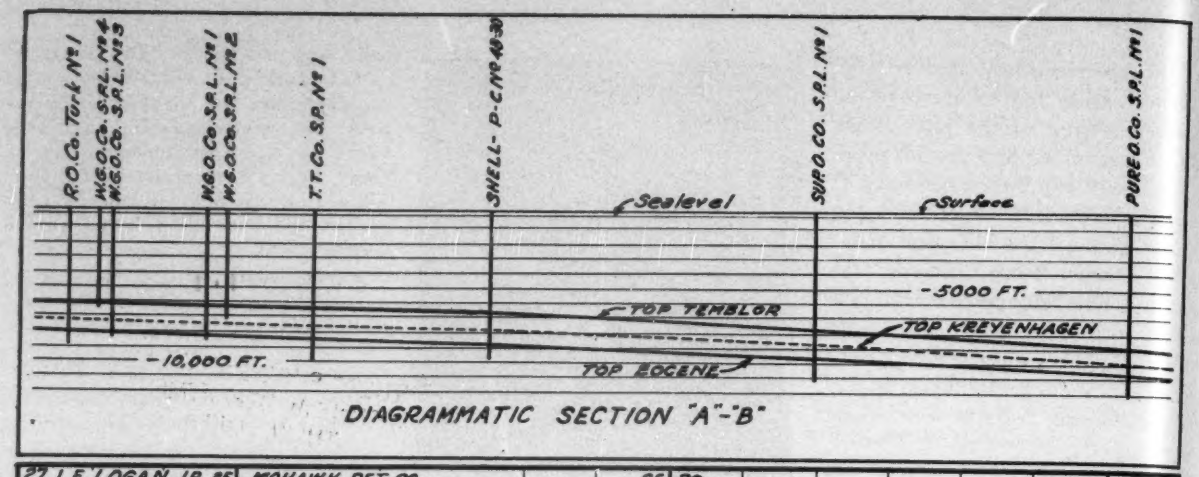
SAN JOAQUIN VALLEY OIL MEN'S BARBECUE

Stockdale Country Club,
Bakersfield, Calif.
June 1.

President: Frank Gess
Union Oil Co.

Chairman of the Barbecue Committee:
Sam (Sambo) Kelly
Hydril Company

Golf, Fun & Entertainment
Barbecue & Refreshments



DIAGRAMMATIC SECTION "A"-"B"

27 J.E. LOGAN, JR. 25 | 44 (Yearout)

MOHAWK PET. CO. (Langdon Nº1 T.D. 6935'

WEST'N. GULF OIL CO. Skelley Estate Nº 1. T.D. 6528 - Elev. 362'

"A"

6 RICHFIELD OIL CORP. (Turk) Nº 1 T.D. 9000' - Elev. 352'

T.D. 6752 Elev. 360'
4 Temblor 6454'
3 T.D. 6342 - Temblor 6444' - Elev. 363'

Temblor 6450'
Kreyenhagen 7500'
Eocene 8400'
Cretaceous ?

WESTERN GULF OIL CO.
2 T.D. 7879' Elev. 391'
Temblor 6600'
1 T.D. 8068' Elev. 388'
Temblor 6528'
Kreyenhagen 7647'
Eocene 8585'

Kreyenhagen 7495'
Eocene 8460'

THE TEXAS CO. (Loescher) 1 T.D. 9613' Elev. 226'
Temblor 6840'
Kreyenhagen 8250'
Eocene 8925'
Cretaceous 9580' ?

17-15

17-16

(CROSS SECTION)

THE TEXAS CO. S.P. Nº31 - T.D. 10,116' - PLUG. 9360'
Temblor 6600' ? Elev. 355'
Kreyenhagen 7750'
Eocene 8775'

SHELL OIL CO. Port Costa Nº 48-30 T.D. 10,711' Elev. 330'
Temblor 6940'
Kreyenhagen 7975'
Eocene 8900'
Cretaceous 10,565' ?

FRESNO COUNTY

SUPERIOR OIL CO. S.R.L. Nº 1 T.D. 11,442' Elev. 905'
Kreyenhagen 9075' Eocene 9880'
Cretaceous ?

18-15

18-16

Elev. 360' - T.D. 12,336'
PURE OIL CO.
S.P.L. Nº 1 "B"
McLure 6950'
Eocene 10,954'

34 36 31 1 6 3 22 24

COALINGA OIL FIELDS

Wilbur Zone Developments*

South of Main Fault in Long Beach Field

By F. A. Graser
Consulting Petroleum Engineer

F. A. Graser

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Fault Data

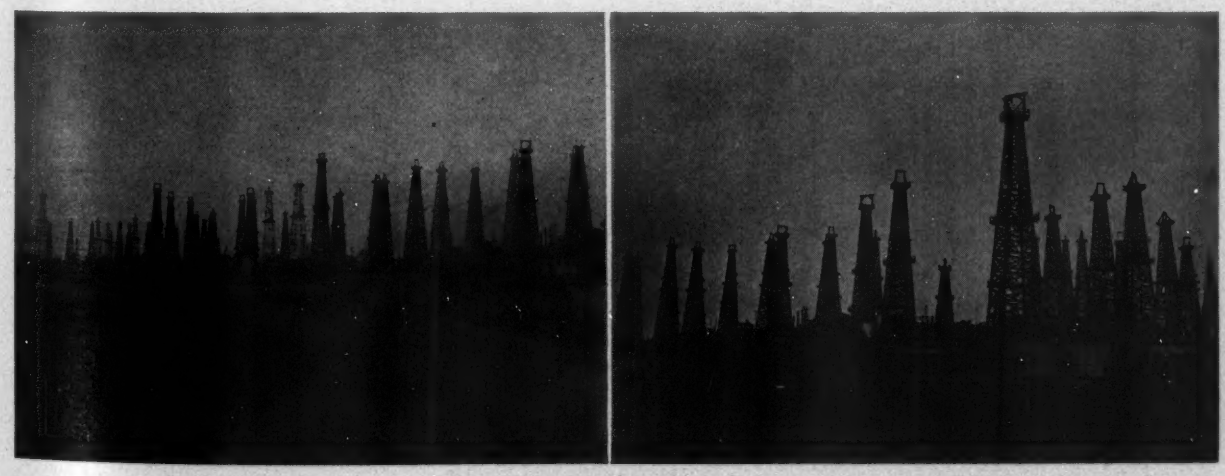
Perhaps the most important structural feature of the Long Beach oil field is the major fault which exists along its south flank. From our subsurface work we geologists and petroleum engineers, who have worked in the Long Beach field, know very closely where this main fault intersects the Brown zone. It is also evidenced on the surface by the escarpment or break in the topography which is plainly visible. The general trend of this fault is from a point on Catalina or 21st Street and Stanley Avenue northwesterly to 25th Street and Walnut, then to the northeast corner of the Sunnyside cemetery, then a short distance north of Spring and Atlantic, then to Pepper Drive and American, and through Los Cerritos Park in the Los Cerritos area. This fault also extends farther out and separates the Hilldon area from unproductive area to the north. The dips on the north side of this fault average 15° to 20° while those south of the fault average approximately 40° in the Brown zone. The Brown zone is mentioned because most of the information regarding the fault and the dip of the formations was determined with the Brown zone as a base. This main fault has a hade to the north estimated at an angle of about 8°. Therefore, the intersection of the fault with the formations above the Brown zone would be farther south than the point that I have given and the intersection of the fault with the formations deeper than the Brown zone would be farther north.

Description of Wilbur Zone

Technically speaking the Wilbur zone as used in the electric logs includes only one sand body with a thickness of 25 to 50 feet depending upon its structural position and the angle of the dip. It is necessary to include the so-called "Yunker" zone and the sand zones lying below the "C" and "D" electric log points as a part of the Wilbur zone but particularly the "Yunker" or Upper Wilbur zone. The "Yunker" zone averages about 60-65 feet in thickness and consists of about 80% oil sand composed of fine floury sand to medium grained sand. Its base is about fifty feet above the top of the main Wilbur sand and the intervening formation is almost entirely shale with a few thin stringers of sand. The productive portion of this sand body on the south side of the main fault lies from about 3000 to 3600' below sea level and from 900 to 1200' above the Brown zone depending upon structural position. The variation in the interval between the "Yunker" or Upper Wilbur and Brown zones is due to the fact that the Wilbur zone lies flatter than the Brown zone with a thickening of the interval progressively downstructure. The "D" zone lies above the "Yunker" zone and the "C" zone above the "D" zone.

History of Area

In order to better understand the development of the Wilbur zone south of the main fault, it is necessary to review a portion of the history of the Long Beach oil field relating to this zone. In the early days of the development of Signal Hill, the first water string was in some instances set over the Upper Wilbur, at the top of the Wilbur zone, and in some cases over the "C" or "D" markers still higher than the Upper Wilbur. Production was



In the Pepper Drive area has been some of the most interesting Wilbur Zone activity. The experienced eye will quickly spot the new steel derricks among the venerable old timers.

Bailing fluid on Union Oil Co.'s LBC No. 20, on Signal Hill, are Bill Falconer, Harvey Culp, Charles Dunphy, Lew Goodrum, and Eli Sanders.

obtained from these Upper zones along with a portion of the Alamitos zone. As edge water encroached, the perforated interval was plugged off and the wells were redrilled, or the wells were deepened through the old casing and the lower zones were developed. Large production was obtained in lower zones and there was no reason for any activity in trying to separate portions of these old zones for small production. The Wilbur zone therefore lay dormant for a number of years. We find that the Upper zones have been rediscovered in nearly every instance during remedial work or redrilling operations where there was insufficient reason to redrill the wells to a greater depth. We also find that some of the operators had noted showings on the ditch in the early work and during so-called deep sand development of 1928 and 1930, and had kept some of this information in their minds or had made notes of them.

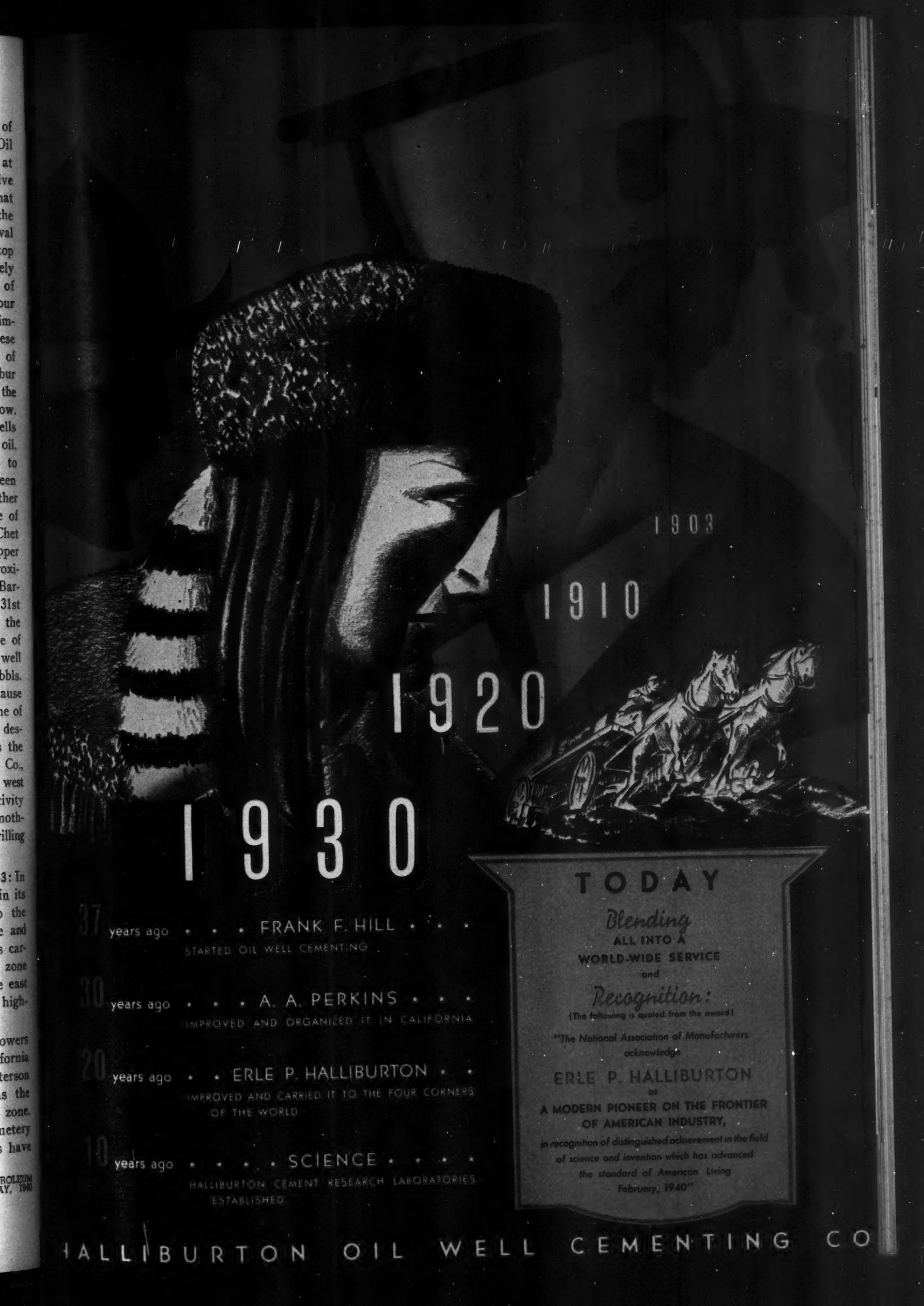
Poppy Syndicate: As a result of previous notations Stevens Oil Co. took cores at a shallow depth while redrilling the old Poppy Syndicate well No. 2, at 31st and Pasadena. In July 1927 they discovered a zone between 3228 ft. and 3288 ft. which was capable of producing 560 bbls. per day of 23 gravity oil cutting 0.4% with 200 lbs. tubing pressure and 28/64" bean. This well produced until 1936 when the casing went bad and the water content had increased to the point that the well was unsatisfactory. This zone has since been identified as being above the Upper Wilbur or Yunker zone in a sand lying below the point "D". Other wells were drilled in the near vicinity of this well with little success. It is interesting to note that wells offsetting to the north obtained entirely new conditions which furnished one of the first proofs of the main fault previously outlined.

This activity died a natural death due to failure of some of the neighboring operators to locate the zone and obtain successful wells in locations which then were considered higher structurally, but which are now known to be across the fault to the north.

California Cooperative: The next development which caused a flurry in the area south of the fault in the Upper zones was caused by perforating California Cooperative Oil Syndicate No. 1, at the southeast corner of 31st and Pasadena, during the early part of 1935. This well lies across 31st Street due south of the Poppy Syndicate or Stevens Oil Company No. 2 well. The depths at which this California Cooperative well was perforated indicate that the well was perforated opposite the Wilbur zone and in the interval between the Wilbur zone and top of the Alamitos zone. Immediately following there was another group of wells drilled taking in the Wilbur zone and a portion of the zone immediately below. A portion of these wells, having noted possibilities of production above the main Wilbur sand took in the "Yunker" zone, the Wilbur sand and an interval below. This combination produced wells up to 200 bbls. of 23° gravity oil. Again the activity ran out due to certain other wells having been failures for one reason or another in this zone. It was a couple of years later in April 1938, that Chet Yunker rediscoverved this Upper Wilbur zone at a depth of approximately 3500 ft., in his well No. "Barbara" 2, on Elm Street between 31st and 32nd Streets. He isolated the upper Wilbur from the balance of the Wilbur zone and a clean well capable of approximately 160 bbls. oil per day was obtained. Because of the isolation of this zone some of the neighboring operators have designated this particular sand as the "Yunker" zone. Exeter Oil Co., Ltd., offset the well to the west and there was a little other activity in the area to the southeast but nothing which led into a regular drilling campaign.

Texas Company's "Foster" 2-3: In October 1938 The Texas Co. in its "Foster" 2-3 well opened up the Upper Wilbur or Yunker zone and obtained a 150 bbl. well. This carried the possibilities of this zone across Atlantic Avenue to the east and showed that the zone was higher in this direction.

During April 1939 Ed. Powers perforated "W.A." 5 on California Avenue between 27th and Patterson to a zone later identified as the "Yunker" or Upper Wilbur zone. The activity spread to the cemetery area where several new wells have


1903
1910
1920
1930
37 years ago • • • FRANK F. HILL • • • •
STARTED OIL WELL CEMENTING
30 years ago • • • A. A. PERKINS • • • •
IMPROVED AND ORGANIZED IT IN CALIFORNIA
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IMPROVED AND CARRIED IT TO THE FOUR CORNERS OF THE WORLD
10 years ago • • • • SCIENCE • • • •
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TODAY
Blending
ALL INTO A
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and
Recognition:
(The following is quoted from the award)
"The National Association of Manufacturers acknowledges
ERLE P. HALLIBURTON
as
A MODERN PIONEER ON THE FRONTIER OF AMERICAN INDUSTRY,
in recognition of distinguished achievement in the field of science and invention which has advanced the standard of American Living
February, 1940"
HALLIBURTON OIL WELL CEMENTING CO

In the Los Cerritos Extension area on A. S. Johnston Drilling Corp.'s No. 37 on the Bixby Lease are, left to right, R. B. Hood, L. K. Black, H. L. Calaway, and F. B. Severns.

been drilled. Here upper production in both sands below the "C" and "D" points have also found commercial production at most favorable locations against the fault.

MacMillan "Dollarhide" 1: In September 1939 MacMillan Petroleum Corp. recompleted "Dollarhide" 1 on the south side of Pepper Drive and one-half block west of American Avenue. A few cores were taken above the Upper Wilbur zone but no zones capable of production were indicated either from the cores or electric log. About 160 bbls. per day of 22.9° clean oil was obtained from the Upper Wilbur zone.

Pepper Drive Area: Because of the presence of a large number of idle wells, abandoned wells and wells nearing the economic limit, it was an opportunity for the smaller operator to obtain some cheap shallow wells. The activity spread very quickly in a southerly direction and in a northwesterly direction to the limits of the zone. Approximately 23 wells have been drilled, redrilled or perforated to this zone of 65 feet thickness covering an area 2000 ft. long against the fault and 300 ft. wide at its greatest width. The northwest end is bordering on water upon completion of the wells. The largest well of this group was completed for a little less than 200 bbls. per day and the decline of oil and the increase in water has been rapid due to the small drainage area and the thin productive zone. D. D. Dunlap Oil Co. cored into the Wilbur sand and found it wet along with gray sand in thin streaks in the intervening shale. Therefore the Wilbur zone as a whole does not offer any further possibilities.

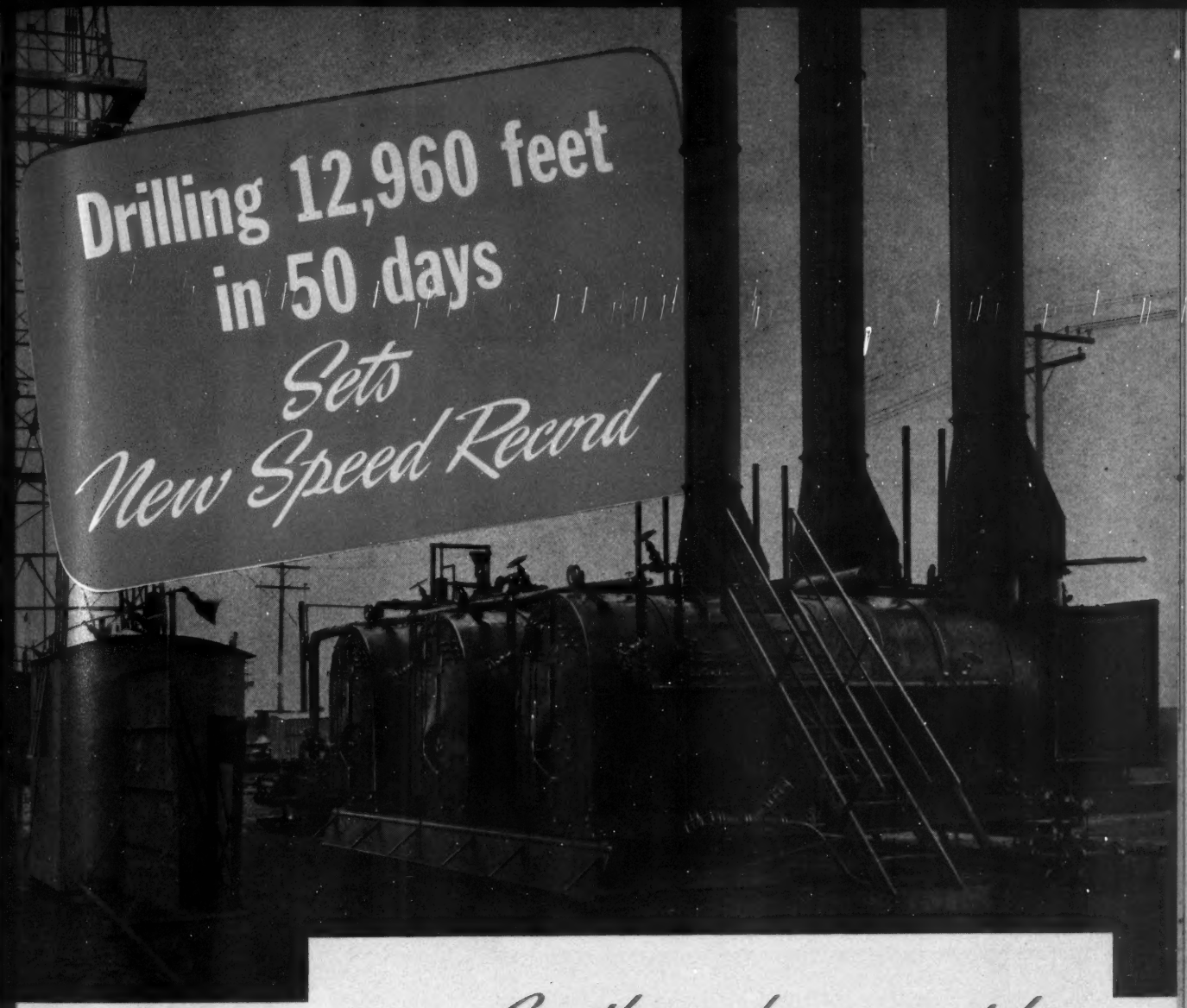
It is worthy of mention that the highest contour on the Upper Wilbur zone is near the easterly end of the Richfield Oil Corp. "Haas" lease; also that electric logs, cores and tests in wells southeast between Orange and Cherry Avenues have indicated possibilities for further development of shallow zones; and that some production has been obtained from shallow wells in this area over a period of years.

Gravel Pack: Due to the existence of fine floury sand, it has been difficult to produce the Upper Wilbur or Yunker zone. As a result the graveled pre-packed liner has been used in a large number of new wells. Liners as small as 4" O.D. with a pre-pack have been used through 6⅝" casing.

Perforating: A number of wells have been perforated to the zone but have not yet given a great deal of sand trouble. This is probably due to a high fluid level and may cause trouble as the fluid head is lowered.

Legal Angle: A number of other problems have presented themselves. Some of the old wells have been surveyed and have been found

Bailing sand on Delaney Petroleum Corp.'s Deco No. 2, in the Signal Hill area are left, Edwin Hester, and A. F. Sorben.



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USES STEAM EFFICIENTLY— this "Oilwell" Engine-driven Power Slush Pump accounted to a large extent for the low fuel consumption.

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WHAT is believed to be a new speed record for rotary drilling has been made by Continental Oil Company in the Wasco, California, field. Drilling of this company's KCL-A5 was completed at 12,960 feet in the almost unbelievable time of 50 actual drilling days.

Ample and dependable power was furnished by three "Oilwell" No. 1 Portable Superheated Steam Generators, supplying superheated steam at 350 lbs. per sq. in. pressure. High-pressure mud circulation, which is also essential to record-breaking drilling, was provided by an "Oilwell" No. 20-P (7¾" x 20") Power Slush Pump driven by an "Oilwell" No. 9 (10" x 9") Vertical Twin-cylinder Steam Engine with variable cut-off.

This equipment *had* to be dependable and of ample capacity for such performance. That it was also efficient is shown by the low fuel-consumption record. The daily average was 609,000 cu. ft. of 1,040 B.T.U. gas. This compares with as much as 2,500,000 to 3,000,000 cu. ft. per day for some rigs in this area. On this basis, with gas at 7½¢ per 1000 cu. ft., the saving is approximately $140 per day.

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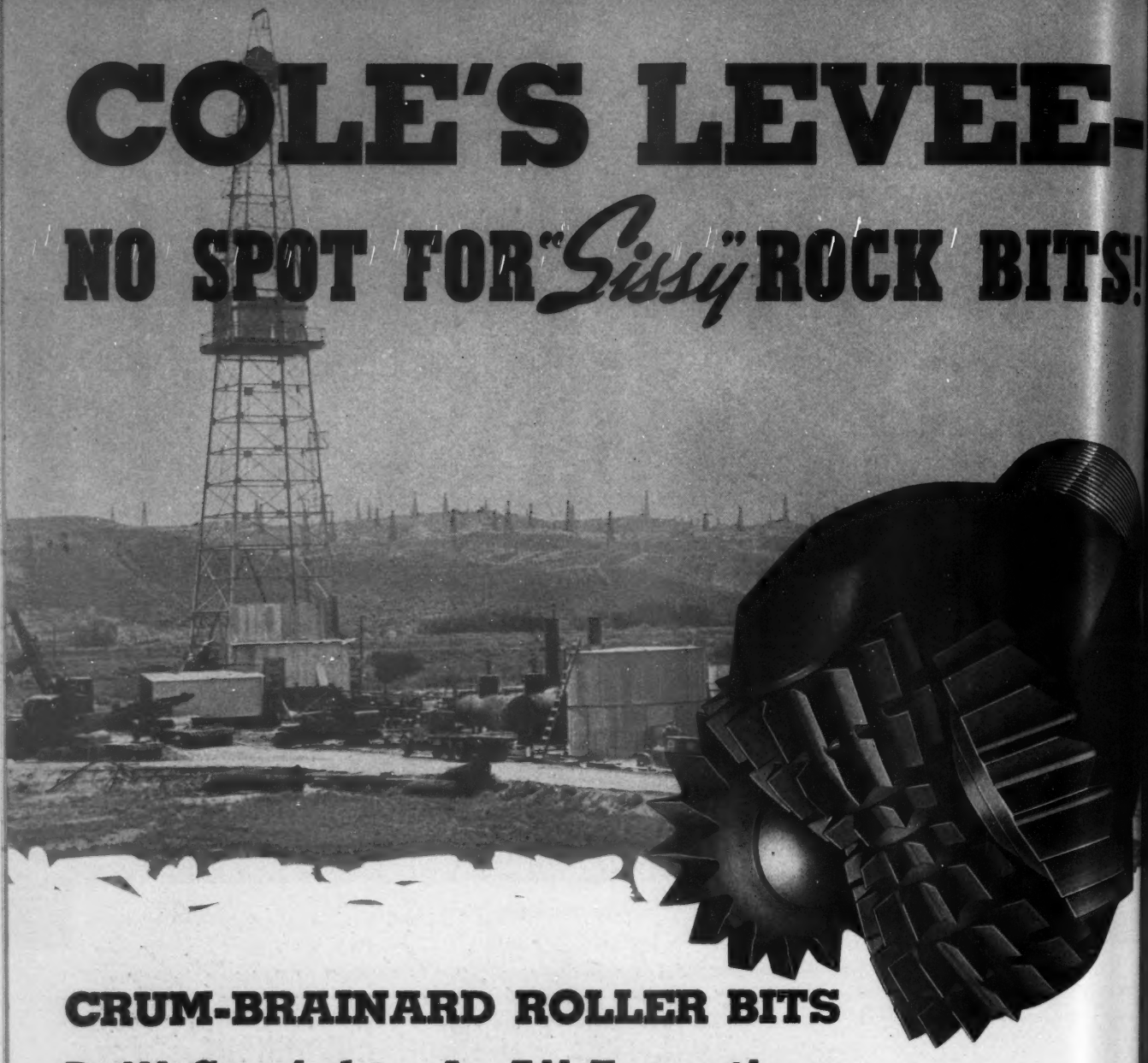

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BRANCH WAREHOUSES

TROLEUM SERVICE CO., SANTA MARIA, CALIF. ★ VALLEY WAREHOUSE, BAKERSFIELD, CALIF. ★ B & G SERVICE CO., AVENAL

Toiling for Union Oil Co.'s transportation department on Signal Hill are, left to right, C. W. Johnson, Bill Littleton, E. R. Casey, and Jack Martin.

to have wandered off the leases. According to the recent interpretations of the law, it has been necessary to start redrilling the well at a depth which will keep the well under the property at all times.

State Requirements: At previous times the depth at which the first shut-off was required by the State Division of Oil and Gas was lowered until it was at one time below 5000 ft. It has been necessary for the State to raise its shut-off requirement back to the upper Wilbur zone where commercial production was obtained.

As a result of the lowering of the shut-off depth, there were instances where the cement did not come high enough to cover the Upper Wilbur and there were other cases where the cement had channeled. In order that the zone would not be damaged by needless exposure to top or intermediate waters, the State required a test showing that these waters were excluded. This was done by perforating at the top and bottom of the zone and testing. If water was excluded, then the balance of the zone could be perforated.

Mechanical Problems: In one case, which was considered most interesting, only medium heavy mud was recovered on the test of the holes at the top of the zone. This mud appeared the same as if it had been just pumped into the hole and yet the well had been producing from a lower zone for several years. Very little oil and gas showed in the mud. Circulation was obtained through the bottom perforations to the outside and back through the top perforations 55 ft. above and between the tubing and casing to the top of the hole.

The circulation was continued until the mud was removed from back of the casing and replaced with water. From time to time the formation would plug the upper holes and the circulation would have to be temporarily reversed. 94 sacks of cement were pumped through the lower holes with the tubing packed off to the casing and the hole washed clean below the holes. Later both sets of holes were found to be open. On a second cement job 100 sacks of cement were pumped out through the lower perforations washing clean below the holes after cementing. Both sets of holes were again open. On a third cement job 66 sacks of cement were pumped through the lower holes with a final pressure of 1800 lbs. The hole was again washed clean. This time the lower holes were tight but the top holes were partially open. On the fourth cement job 63 sacks of cement were pumped through the top holes after

Tunnell, Wood & Neilan, Inc., have recently been appointed exclusive distributors for National Transit Pump & Machine Co., in Southern California. From left to right are Gordon Tunnell, Robert H. Jones, T. J. Neilan, and H. C. Wood. National Transit pumps and prime movers are widely used in the producing, refining and transportation branches of the petroleum industry.

a final pressure of 1600 lbs. The holes were finally tested at 1800 lbs. and would not take fluid. This work was done over an elapsed time of a little over three days using the well pulling crew and an estimated 323 sacks of cement were pumped away behind the 6⅝" casing in 9⅝" hole.

After five days standing four new holes were shot below the former upper perforations and four above the former lower perforations. Upon standing one hour with a formation tester in the hole, the formation gave up one stand of oil sand and 21 stands of fluid of which 18 were oil. Gas reached the surface in three minutes. After perforating the balance of the zone the well was put on the pump and produced an average of about 85 bbls. net oil during the first month and cut only about 9% which was not above the average cut for the area. All of the work done was done with production equipment, a power equipped cement truck and a special cementing tool on the bottom of the tubing. It was unnecessary to drill out any cement and the perforating was done with a gun perforator.

There were other cases where holes or splits were found in the water string and it was necessary to support the water string by means of a smaller casing cemented inside or set on a packer.

Summary: In summation, the following points have been presented:

1. The location of the major fault has been outlined.

2. The Wilbur zone has been shown to be composed of several parts as follows (from the bottom up):

   (a) Wilbur sand
   (b) "Yunker" or Upper Wilbur zone
   (c) "D" sand
   (d) "C" sand

These sands vary in areal extent but the principal one in the later development is the "Yunker" or Upper Wilbur sand.

3. The history of the area south of the major fault in the Long Beach oil field, shows a series of developments or temporary hot spots as the lower zones are depleted; also that the Wilbur zones are not new but have been known to exist since the early development of the Long Beach oil field.

4. Mechanical difficulties have been met on perforating work which has introduced novel methods of handling wells.

5. It is safe to say that there will be further development in the Wilbur zones east of Orange Avenue south of the main fault.

**Author's title: "Recent Developments in the Wilbur zone, South of the Main Fault in the Long Beach Field." Presented before the Los Angeles Basin Chapter of A. P. I., May Meeting, at Long Beach.*

Former Shell Executive Heads Carbon Corp. Sales

Appointment of Robert T. Collier as vice president in charge of Pacific Coast Sales of the Great Lakes Carbon Corp.

Robert T. Collier

was announced recently. He will make his headquarters in Long Beach where the company is constructing deep water bulk cargo loading facilities. The company's large coke calcining and storage plant is now nearing completion at Wilmington.

Mr. Collier resigned as assistant general sales manager of Shell Oil Co., Inc., in March.

He has been a leader in Pacific Coast oil circles for many years. For the last eleven years he was with Shell.

Discovery of an important oil field in southeastern Turkey was announced on April 25; after 7 months of drilling under the direction of American engineers.

L. B. Little Honored At First Well Site

A group of seventy-five veteran Standard Oilers gathered in the shadow of the state's first oil well in Pico Canyon on May 10 for a birthday barbecue in honor of L. B. Little, general superintendent of the company's Producing Department in the Southern California District. These veterans were mostly members of the Producing Department and had an average service with the company of more than 20 years.

Roy Gunn acted as master of ceremonies and introduced Walton Young, who spent 35 years in the Producing Department in the Pico Canyon area. Mr. Young retired from active service some years ago. Attorney Oscar Lawler, on behalf of those present, presented a gift to Mr. Little in celebration of his 59th birthday.

In addition to the Producing Department members there were also present A. P. Johnsen, district sales manager for the company in Los Angeles, H. C. Hanna, manager of the El Segundo refinery, J. E. Klein, superintendent of the Pipe Line Department for Southern California, and representatives of other departments.

Pico Canyon was a logical spot in which to hold such a celebration since it was the site of the state's first successful oil well, drilled by D. G. Scofield and his associates of the California Star Oil Works in 1875. From Pico Canyon the first pipe line in the state was laid which conveyed the oil by gravity to the state's first refinery in Railroad Canyon near Newhall, so that this area is truly the cradle of the California oil industry. The Standard Oil Co. of California in 1930 restored the old Newhall refinery to its original condition as a memorial to the oil industry's pioneers. This refinery may be viewed by the public at any time.

The California Star Oil Works later became the Pacific Coast Oil Co. and finally Standard Oil Co. of California. D. G. Scofield, the driller of the state's first successful well, was for many years president of Standard Oil Co. of California.

Following the gift presentation refreshments were served and the rest of the evening was spent in a general get-together.

Patterson-Ballagh Moves New York Export Office

The New York City export office of Patterson-Ballagh Corporation has been removed from 39 Cortlandt Street to 92 Liberty Street, where enlarged quarters have been leased.

Production « « » » Development

(Figures of Production and Stocks are in barrels of 42 Gals.)

	Total Production March	—DAILY AVERAGE— Mar., 1940	Feb., 1940	Mar., 1939
Group No. 1				
Arvin	70,388	2,271	2,325	165
Belridge—North	343,397	11,077	11,374	11,966
Belridge—South	61,192	1,974	1,959	1,207
Canal	175,716	5,668	5,739	4,466
Canfield Ranch	1,481	48	53	46
Coalinga	718,532	23,178	21,570	10,595
Cole's Levee	103,724	3,346	3,043	225
Edison	69,924	2,256	2,108	2,260
Elk Hills	385,841	12,446	12,329	10,123
Fruitvale	178,500	5,758	5,795	7,053
Greeley	106,652	3,440	3,171	1,791
Kern River	341,532	11,017	11,157	11,253
Kettleman Middle Dome	.....	.....	.....	37
Kettleman No. Dome	1,470,560	47,437	50,937	56,100
Lost Hills	129,916	4,191	4,156	3,420
McKittrick	110,166	3,554	3,460	3,899
Midway-Sunset	1,616,222	52,136	52,043	55,435
Mountain View	207,187	6,683	7,153	8,608
Mount Poso	292,472	9,435	9,633	13,273
Paloma	5,696	182	184	.....
Rio Bravo	247,882	7,996	8,322	8,145
Round Mountain	228,651	7,376	7,595	11,614
Strand	43,890	1,416	1,142	9,109
Ten Section	269,737	8,701	8,417	.....
Tupman	33,683	1,087	1,063	264
Wasco	40,012	1,291	1,449	903
Wheeler Ridge	9,555	308	317	372
Group No. 2				
Capitan	59,386	1,916	1,954	2,666
Elwood	118,812	3,833	3,820	4,634
Rincon	116,594	3,761	3,785	2,923
San Miguelito	94,472	3,048	2,955	2,324
Santa Barbara	10,251	331	187	289
Santa Maria	143,233	4,620	3,544	6,476
Santa Maria Valley	384,542	12,405	11,713	10,726
Summerland	862	28	23	22
Ventura Avenue	1,063,525	34,307	37,144	33,685
Ventura-Newhall	228,699	7,377	7,028	5,829
Watsonville	775	25	25	30
Group No. 3				
Brea-Olinda	174,147	5,618	5,652	5,636
Coyote—East	103,568	3,341	3,222	2,527
Coyote—West	201,938	6,514	6,083	7,970
Dominguez	603,003	19,452	19,636	21,256
El Segundo	73,749	2,379	2,575	3,451
Huntington Beach	846,936	27,320	27,583	28,678
Inglewood	398,806	12,865	12,396	12,647
Lawndale	1,375	44	44	72
Long Beach	1,373,136	44,295	45,005	48,511
Los Angeles-Salt Lake	16,351	527	513	503
Montebello	631,017	20,355	23,751	15,021
Playa Del Rey	131,442	4,240	4,239	5,301
Potrero	52,746	1,701	1,937	879
Richfield	286,031	9,277	8,750	8,512
Rosecrans	301,333	9,720	10,031	15,243
Santa Fe Springs	802,143	25,876	25,840	28,317
Seal Beach	226,911	7,320	7,566	7,612
Torrance	373,074	12,035	12,315	21,892
Whittier	31,025	1,001	1,006	985
Wilmington	2,560,003	82,581	81,553	85,114
Total	18,672,342	602,334	608,367	622,058
February	17,642,640	608,367		
Decrease (*Increase)	1,029,702*	6,033		

	New Rigs Up	Active Drilling	Producers Completed	Daily Initial Output	Active Producing	Abandoned Wells Drillers	Abandoned Wells Producers
Group No. 1							
Arvin	..	....	....	....	15	....	....
Belridge—North	1	1	1	930	78	....	....
Belridge—South	..	....	....	....	162	....	....
Canal	..	1	1	1,395	31	....	....
Canfield Ranch	..	....	....	....	1	....	....
Coalinga	14	19	9	13,395	889	....	....
Cole's Levee	1	3	2	766	18	1	....
Edison	..	....	2	195	93	....	....
Elk Hills	..	....	....	....	196	....	....
Fruitvale	..	1	....	....	170	....	....
Greeley	3	4	1	3,005	27	....	....
Kern River	5	7	5	21	1,547	....	....
Kettleman North Dome	4	17	2	2,543	251	....	....
Lost Hills	..	1	....	....	358	....	....
McKittrick	2	2	2	300	208	....	....
Midway-Sunset	2	5	3	203	2,618	....	1
Mountain View	..	....	1	75	185	....	....
Mount Poso	2	3	1	120	270	....	....
Paloma	..	2	....	....	1	....	....
Rio Bravo	2	4	1	973	44	....	....
Round Mountain	..	....	....	....	220	....	....
Strand	1	2	....	....	7	....	....
Ten Section	2	2	2	3,205	44	....	....
Tupman	3	5	....	....	5	1	....
Wasco	..	2	1	2,568	9	....	....
Wheeler Ridge	1	....	....	....	34	....	1
Group No. 2							
Capitan	..	....	....	....	42	....	....
Elwood	..	....	....	....	73	....	....
Rincon	..	2	1	587	61	....	....
San Miguelito	..	1	....	....	22	....	....
Santa Barbara	..	....	....	....	23	....	....
Santa Maria	1	1	....	....	161	....	....
Santa Maria Valley	..	....	2	960	66	....	....
Summerland	..	1	....	....	8	....	....
Ventura Avenue	4	9	4	5,340	314	....	....
Ventura-Newhall	3	6	....	....	553	....	....
Watsonville	..	....	....	....	7	....	....
Group No. 3							
Brea-Olinda	..	....	1	125	359	....	....
Coyote—East	..	....	....	....	79	....	....
Coyote—West	..	1	....	....	60	....	....
Dominguez	2	4	1	2,280	184	1	....
El Segundo	..	....	....	....	47	....	....
Huntington Beach	1	2	2	632	529	....	....
Inglewood	1	....	....	....	208	....	....
Lawndale	..	....	....	....	5	....	....
Long Beach	6	7	3	265	1,213	....	1
Los Angeles-Salt Lake	..	....	....	....	107	....	....
Montebello	5	11	6	2,050	362	....	2
Playa Del Rey	..	....	....	....	156	....	....
Potrero	..	1	....	....	18	....	....
Richfield	..	1	....	....	302	....	....
Rosecrans	6	5	4	1,070	147	....	....
Santa Fe Springs	..	....	....	....	578	....	....
Seal Beach	1	1	....	....	117	....	....
Torrance	1	1	1	150	696	....	13
Whittier	..	1	....	....	140	....	....
Wilmington	19	16	12	3,911	804	....	....
Miscellaneous Drilling	10	37	....	....	....	5	....
Group No. 4—Gas Fields							
Buena Vista Lake	..	....	....	....	5	....	....
Buttonwillow	..	....	....	....	19	....	....
Chowchilla	..	....	....	....	....	....	....
Delano	1	1	1	Gas	14	....	....
Dudley Ridge	..	....	....	....	....	....	....
Fairfield Knolls	..	....	....	....	....	....	....
Goleta	..	....	....	....	....	....	....
Marysville	..	1	....	....	3	....	....
McDonald Island	..	....	....	....	5	....	....
Rio Vista	1	....	....	....	22	....	....
Semi-Tropic	..	....	....	....	2	....	....
Tracy	..	....	....	....	5	....	....
March	105	191	72	47,064	14,996	8	18
February	76	188	55	57,017	14,971	32	37
Increase (*Decrease)	29	3	17	9,953*	25	24*	19*

SUMMARY OF CALIFORNIA OILFIELD OPERATIONS FOR MARCH 1940—STOCKS HELD IN PACIFIC COAST TERRITORY BY CALIFORNIA OIL COMPANIES

	March 31, 1940	Feb. 29, 1940	March Changes	March 31, 1939
1. Gasoline-Bearing Crude	35,804,861	35,995,435	— 190,574	39,215,749
2. Non-Gasoline-Bearing Crude	13,499,792	13,405,906	+ 93,886	15,808,425
3. Unblended Nat. Gas	1,875,107	1,747,755	+ 127,352	2,137,937
4. Gasoline (not including distributing and service stations)	17,572,852	17,678,049	— 105,197	15,805,417
5. Naphtha Distillates	1,565,034[1]	1,413,829[1]	+ 151,205	1,384,449[1]
6. Gas Oil and Diesel Oil	9,326,881	8,980,220	+ 346,661	10,382,404
7. Fuel Oil Residuum	64,947,259	65,648,712	— 701,453	70,551,947
8. All Other Stocks	8,388,953[2]	8,339,383[2]	+ 49,570	6,306,740[2]
TOTAL	152,980,739	153,209,289	— 228,550	161,592,968
[1]Estimated amount of unfinished gasoline contained in item 5	1,366,700	1,163,797		1,184,846
[2]Coke included in item 8	1,146,960	1,083,825		189,832

Field Development

San Joaquin Valley

Core Hole Uncovers Promising Tar Sand

A mile and a half west of Midway production, and due west of the city of Taft, Republic Petroleum Co.'s Core Hole No. 1 drilled into what appears to be excellent tar sand.

Carried to 1576 ft. with light equipment, the drill encountered tar sand bodies at 750 ft. which continued intermittently to 970 ft. at which point the sands totaled 90 ft.

The company is at present building derrick to carry the hole to 2100 ft. in an effort to find sands suspected to underlay the tar. Failing to find deeper productive horizons, the company will plug back and attempt a completion in the upper zone.

Bolling Oil Drills Richgrove Wildcat

Rigging up in the northeast quarter of sec.14,25-27, Bolling Oil Co.'s Quinn No. 1 is the latest to attempt finding production in the Richgrove area. Located about 10 miles northeast of the town of McFarland, the well is in an area, drilled to shallow depths many times in the past.

Standard Oil Seeking Kettleman Extension

Chief interest in the Kettleman North Dome field centers on the Standard Oil Co.'s brace of tip locations. At the southerly tip of the elongated structure Standard has poured foundation for well No. 1-1U near the northwest corner of sec.1,23-18. This well is more than a quarter of a mile south of nearest production and lies between the field and well No. 54 which Standard drilled near the center of the section to a barren 9675 ft.

At the northerly edge of the field, the company has located No. 344-13H near the southeast corner of sec.13,21-16. A half mile beyond this spot, which is but one location northwest of production, Standard previously drilled No. 46 to an unsuccessful 11,030 ft.

Recent completions marked up by Standard in prolific sec.27,22-18 were 41-27Q, finished for 1722 barrels of 38 gravity oil, No. 63-27Q completed flowing 1575 barrels and No. 72-27Q which made 1110 barrels of 36 gravity oil through a 35-64 in. bean.

Aside from Standard and the K.N.D.A., an operating association of lease holders, Union Oil Co. is the only small unit operator currently active. Union is drilling Amerada-King No. 9 below 9800 ft. on its 160 acre lease in the southwest quarter of sec.29,21-17.

Union Oil Completes 15th Rio Bravo Well

Bottomed in the Vedder at 11,474 ft.

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Cantua Creek	Logan, J. E., Jr., Yearout	44	26, 16-14	5110	Drilling
	The Texas Co., S.P.	1	23, 17-15	10116	Testing
Coalinga	Lewis, C. H.	1	18, 21-15	1718	Drilling
	Section Thirty Oil Co.	7	30, 19-15	1181	Drilling
	Shell Oil Co.	45-2	2, 20-15	3745	Swabbing
Jacalitos Hills	Continental Oil Co., Kreyenhagen	1	4, 22-16		Rig
Kingsburg	Erickson & Swanson	2	22, 16-22	625	Idle
Mendota	Jergins Oil Co., Cheney Ranch	1	29, 14-13	9100	Drilling
	Kern County				
Arvin	Morton, Lindley C., Jewett	1	23, 31-29	6765	Testing
Belridge—South	Santa Mora Oil Co.	1	10, 28-20		Material
	Union Oil Co., Fitzgerald-Weston	1	13, 29-21	7476	Drilling
Buena Vista	Gen. Pet. Corp., B.V.A.	1	1, 32-24	11886	Idle
	Shell Oil Co., B.V.A.	45-9	9, 32-25	12019	Drilling
Comanche Point	Oil Scout, Inc.	1	27, 32-29	6639	Drilling
Devil's Den	Trigg, H. C.	1	11, 25-18	492	Rigging up
Edison	Goodrum & Vincent, Inc., S.P.	5	31, 29-30	395	Cleaning out
Grapevine	Kern Line Oil Co.	1	19, 11-19		Rig
	Richfield Oil Corp., Tejon Ranch	1	2, 10-19	5665	Drilling
Greeley—South	Superior Oil Co., Brandt	1	28, 29-26	8027	Drilling
McKittrick	Franco-Western Oil Co.	19	8, 30-22	991	Running liner
	Hoyt, Otis, Union	1	6, 30-22		Rig
Midway	Republic Pet. Corp., C.H.	1	18 32-23	1576	Bldg. rig over core hole
Richgrove	Bolling Oil Co., Quinn	1	14, 25-27		Rigging up
Semitropic	Gen. Pet. Corp., K.P.C.	1	16, 26-22	4481	Drilling
	North Kern Oil Co., Sawyer	1	16, 25-22	3925	Drilling
Shale Hills	Scotia Exploration Co., Abbott	1	7, 27-19	2047	Idle
	The Texas Co., McD-Theta	1	12. 28-19	3395	Redrilling 2030
Wheeler Ridge	Richfield Oil Corp.	KCL 2	28, 11-20	1956	Recementing
	Kings County				
Kettleman—South Dome	Bristol Oil Co., Smith	1	35, 24-19	8054	Fish bailer
	Tulare County				
Trico	Tidewater Assoc. Oil Co., Daniels	35	22, 24-23	478	Drilling

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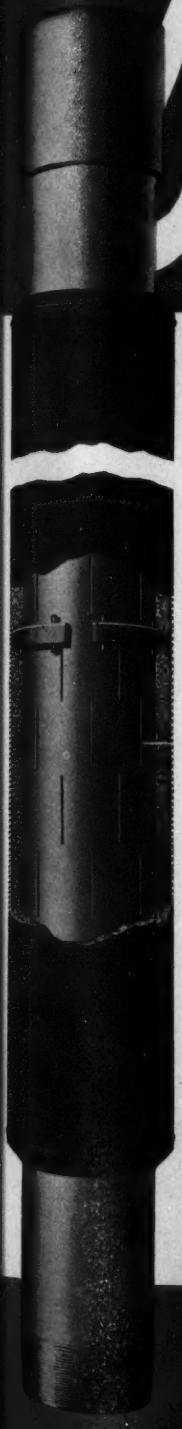

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AXELSON

SELLS AND SERVICES DEEP WELL PLUNGER PUMPS AND SUCKER RODS

Union Oil Co. finished Kernco No. 54-34 flowing 1256 barrels of 39 gravity oil through a 7-64 in. bean under 1875 pounds tubing pressure. The large volume through such a small orifice is even more remarkable when it is considered that 1,615,000 cu. ft. of gas also passed the bean in a 24-hour period.

This is the fifteenth such completion on Union property in the Rio Bravo field, all but one of which have been in sec.34,28-25. The company is at present drilling three additional projects in the section.

Joining Union in the Rio Bravo activity is Superior Oil Co., which to date has finished 23 wells in the area, some of which were drilled to the 11,500 ft. level in world's record time. The unusually fast time of 37 days from spud to finish is in a great measure due to the gigantic rigs which the company employs.

Superior is at present running two huge rigs with preparations under way to dig three more as fast as the wells are finished. Of greatest current interest is Superior's Osborn No. 3-1, which is drilling near the center of sec.28,28-25 in an effort to push the productive limits more than a quarter of a mile to the northwest.

Buena Vista Hills Deep Test Started

Grading for a deep test near the center of the southwest quarter of sec.10,32-24, in the Buena Vista Hills field, Honolulu Oil Corp. becomes the center of attention in south Valley operations.

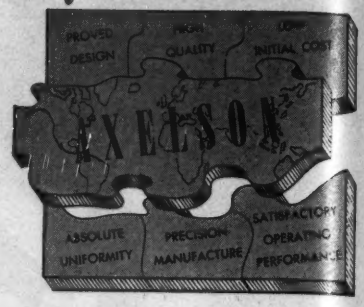
The well, No. 25-P, is intended to explore the deep Valley zones believed to underlay the old shallow field. Situated high on structure the current try will find the Miocene and Eocene levels at shallower depths than the wells at the base of the hills and near the lake bed where General Petroleum Corp.'s BVA No. 1 is idle at 11,886 ft. after drilling well into the Stevens zone and finding few sand bodies. Shell Oil Co.'s BVA No. 45-9, at the edge of the lake in sec. 9,32-25, hung up in shale and streaks of very hard sand showing a few oil stains at 12,027 ft. This well is also deep into the zone and its history has closely paralleled the unfortunate results of G.P.'s suspended wildcat.

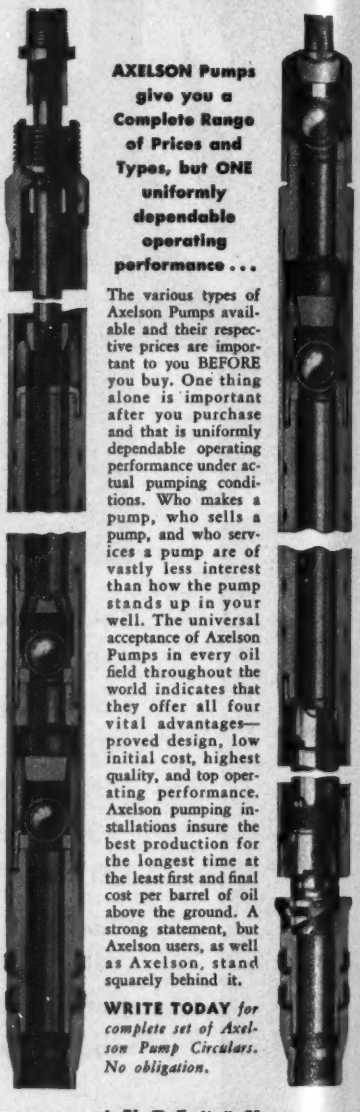
Morton Testing Chanac Oil Sand

Drilled to 6766 ft. after topping basement schist at 6696 ft., Lindley C. Morton plugged Jewett No. 1 at 6680 ft. for tests of Chanac oil sand cored from 6574 to 6661 ft.

Located in sec. 23,31-29, southeast of

Only one name fits...





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AXELSON

SELLS AND SERVICES DEEP WELL PLUNGER PUMPS AND SUCKER RODS

the Arvin area of the Mountain View field, the well is attempting to isolate another of the small fault accumulations for which the east Valley is famed. Late last year, Morton drilled Barlow-Farms No. 1 to the schist at 5977 ft. a little more than a mile southeast of the current try.

Paloma Completions Are Yet Pending

Ohio Oil Co.'s KCL No. B-2-43-3 and Western Gulf Oil Co.'s KCL No. A-74-3, second and third wells, respectively, in the Paloma field, are not yet completed.

The Ohio well, one location north of the discovery well in sec. 3,32-26, was spudded Oct. 6, 1939. Harassed by a series of fishing and redrilling jobs, a bottom of 10,361 ft., just over the main Stevens zone sand, was reached by March 9, 1940. At this point drill pipe was lost and a long period of fishing begun. At the last report the project was fishing drill pipe with top at 9808 ft.

The Western Gulf well, spudded three days later, made a formation test from 10,435 ft. in early February which flowed more than 800 barrels of clean 47 gravity oil with 35,000,000 cu. ft. of gas. Determined to exhaust the possibilities of the Stevens zone, the well was deepened and by late April reached 11,216 ft. Plugged to 10,700 ft. and with liner landed for further tests of the Stevens sand, re-cementing jobs, a minor fishing job, and gun perforating have delayed the long awaited completion.

Superior Tests First Sand Body

Drilling to establish a successive high on the main trend of the Rio Bravo, Greeley Extension and Greeley fields, Superior Oil Co.'s Brandt No. 1 in sec. 28,29-26 was last reported at 7836 ft. A formation test of the first promising sand body was made in the interval 7449 to 7535 ft., recovery from which was about 350 ft. of very gassy mud showing traces of oil and 4200 ft. of salt water. water.

This may be the same zone that Superior tested in KCL No. 9 during 1937. This well, located a mile southeast of the current try in the northeast corner of sec.3-30-26, tested from 7558 to 7580 ft. flowed for two hours at more than an 800 bbl. rate of clean 24 gravity oil. After the short flow the well died when mud broke in. Efforts to produce the well on gas lift yielded only a small amount of fluid cutting 52% mud with no free water. The well was redrilled, and on formation tests recovered only mud and salt water. Well No. 10 drilled nearby to 8403 ft. found no oil sands present, while No. 12 was carried to a barren 13,131 ft.

Kern Line to Test North Grapevine Area

Near the center of sec.19,11-19, Kern Line Petroleum Co. has a derrick up for its first well on a structure said to have been delineated by the application of a new electric interpreting device. The project is three miles northwest of the small Grapevine field and a half mile east of the main Ridge Route highway. Plans call for the test to be carried to 6500 ft. if necessary, but the predicated sands are thought to be much higher.

Two miles south of the field, Richfield Oil Corp.'s Tejon Ranch No. 1 is drilling at 5665 ft. Wheeler Ridge-KCL No. 2, high up on the hills in sec. 28,11-20, was last reported cementing the surface casing after drilling to 1955 ft. This well is attempting to find production in the Miocene and Oligocene, which was proved present but wet in well No. 1. The current try, 1600 ft. south of No. 1, is believed enough up structure to miss the water trouble.

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Conoco Test Jacalitos Hills

On a location just off the surface trace of the Jacalitos anticline, near the north quarter corner of sec. 4,22-16, Continental Oil Co. is building rig for Kreyenhagen No. 1.

The play, some 5 miles west of North Kettleman Dome production, is believed similar to the Eocene shoreline development taking place 10 miles north of this try.

Situated in a sparsely drilled area, the current try is located more than a mile and a half northeast of Superior's 7838 ft. hole drilled in 1934. The Superior well, Mantes No. 1, was near the east quarter corner of sec. 6,22-16 and bottomed in the Domengine which was topped at 7648 ft. If this sand horizon which is similar to the Gatchell Zone can be found in a fully closed anticline as at Kettleman or in a stratigraphic trap as at Coalinga, a new field will be discovered.

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Jergins Wildcat Remains Mystery

Constantly plugging all leaks in the walls of secrecy surrounding their operations in the Mendota area, Jergins Oil Co. holds the undisputed record for maintaining an absolutely "no-dope" status over a long stretch.

Situated near the west quarter corner of sec. 29,14-13 on the Cheney Ranch in Fresno county, the well has excited the interest of oildom partly through its possibilities and partly through its impregnable mystery.

Believed to be currently coring below 9100 ft., the try is quite low in the geologic column since the Domengine Eocene sands were reported near 4500 ft. and the Cretaceous at 5800 ft. by sources purportedly well informed.

Formation tests of sands encountered near 6700 ft. were inconclusive and results of subsequent tests near 8400 ft. are as yet obscure.

The general supposition is that this well now offers little encouragement and that current activity is only to exhaust all possibilities before shifting exploration efforts to another section of the structure.

Texas Co. Testing Potential Discovery

Near the northeast corner of sec. 23, 17-15 in the Cantua Creek district of Fresno county, The Texas Co. is testing sands which may prove to be the first major oil strike since August 1939.

The current well, S. P. No. 1, is on the main trend through the area which has been repeatedly drilled by Texas, Shell, Richfield, Pure, Western, Gulf and Superior, all of which reported sand bodies in the Eocene section and none of which proved productive.

Located in the middle of the play, Texas' well is testing sands first marked in the Eocene horizon at 9345 ft. and which are believed to be different sections than those tested in earlier wells.

Prior to running casing and liner, an 8 ft. interval above 9360 ft. yielded a strong gas blow containing some high gravity condensate. With 7 in. pipe at 9330 ft. and 5 in. liner containing 78 ft. of perforations c.p.'d at 9335 ft., the well will soon return an answer to the speculation which is rife concerning this project.

Top of the Eocene section itself was found at 8775 ft., the green sand at 8778 ft. and what is called the Gatchell equivalent at 9345 ft. The position in relation to other wells is clearly shown by the map and diagrammatic section printed in this issue. This map is purely a representation of the position of wells and thickness of geologic horizons as found by adjacent drilling. It does not attempt to picture sand bodies that have been encountered in all wells nor does it show the probable pinching out of sands accounting for The Texas Co.'s accumulation. (See map page 14.)

Union Oil Quits S. Belridge Try

A mile and a half southeasterly from the tip of the South Belridge oil field, in sec. 13,29-21, Union Oil Co.'s Fitzgerald-Weston No. 1 is abandoned after 7493 ft. of fruitless drilling.

Two miles north of the field, Santa Mora Oil Co. is completing a water well and has moved in material to drill well No. 1 in sec. 10,28-20.

Oil Company Safety Honored by Mines Bureau

Nine departments and plants of U. S. oil companies have received certificates of honor from the Jos. A. Holmes Safety Association "in recognition of operation over long periods of time without fatalities or lost-time accidents, or with remarkable low-accident records." The association, which closely is connected with the U. S. Bureau of Mines, annually honors individuals and companies in the mineral and allied industries for meritorious instances of heroism, and for outstanding safety records. Many coal-mining and other mineral companies also were recipients of 1939 awards.

Among the oil companies who were given 1939 awards are: Dominguez Refinery, Shell Oil Co., Wilmington Calif.; Martinez Refinery, Shell Oil Co., Inc., Martinez, Calif.; Natural Gasoline Department, Shell Oil Co., Inc., San Francisco.

The typical wage-earning, car-owning family spends $197.74 annually to operate its car for business and pleasure, according to a survey of 6,366 car-owning families made by the U. S. Bureau of Labor Statistics. The figure includes car-purchase costs, taxes, and expenses for gasoline, oil, and repairs.

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3. ***Friction Clutch On Rotary Table Drive***—Results in the *Elimination* of *Shocks* and *Jars* and assures *Smooth, Instant Engagement.*

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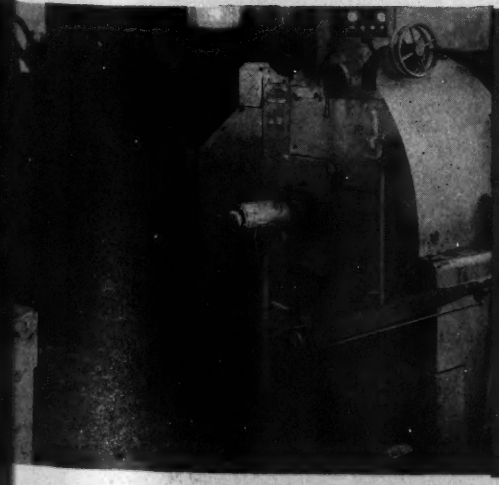

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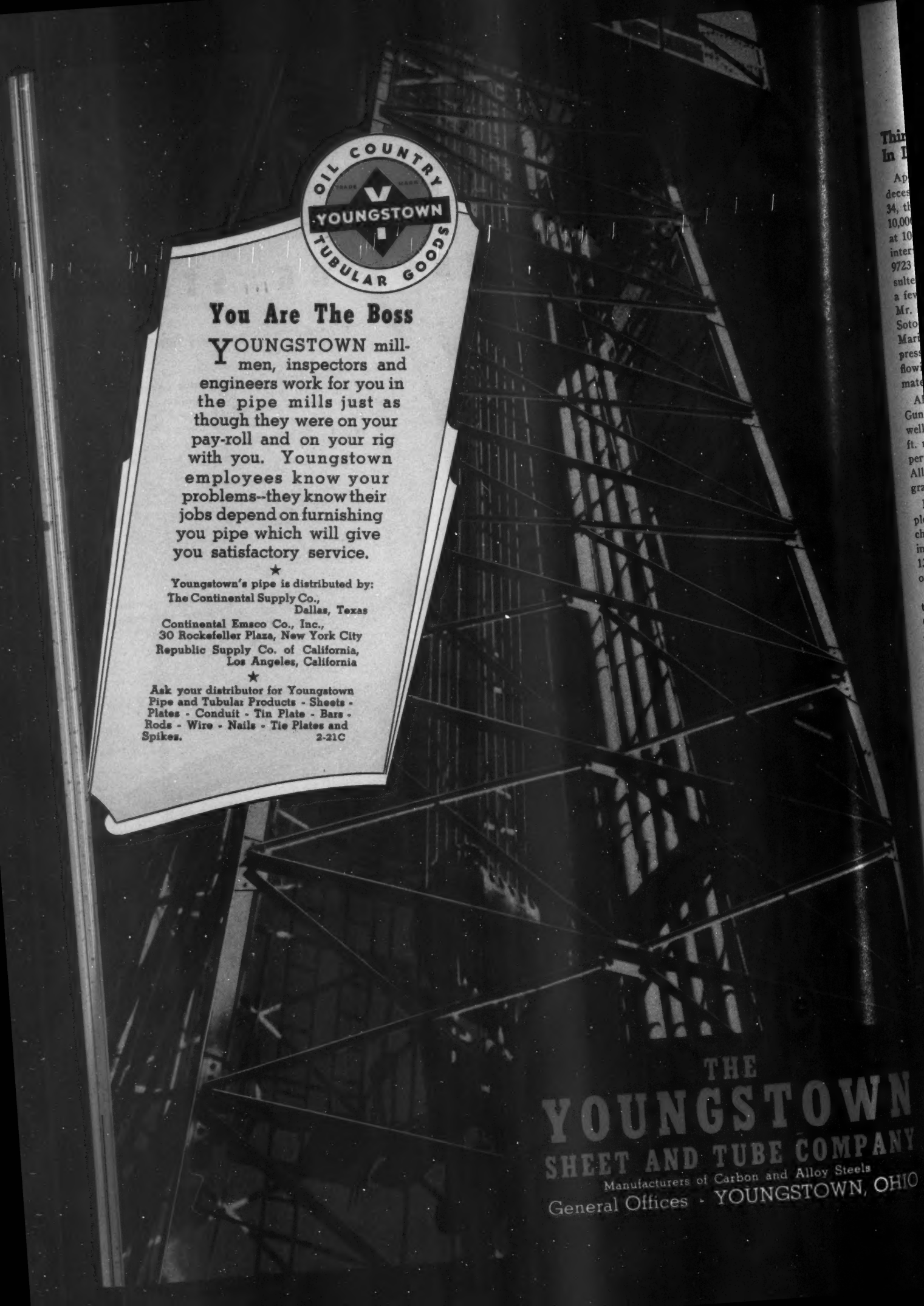
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Los Angeles Basin

Third Well Completed In Long Beach Deep Zone

Apparently similar to its two predecessors is Allied Petroleum Co.'s No. 34, the third well to be completed in the 10,000 ft. Signal Hill zone. With bottom at 10,636 ft. and a liner perforated in the interval below the 7 in. casing shoe at 9723 ft., the swab, run for three days, resulted only in a fair fluid follow-up and a few short heads. Taking his cue from Mr. Jerman's experience with both De Soto No. 1 and Dormax No. 1, John De Maria ordered the installation of a compressor and at last reports the well was flowing on gas lift with no accurate estimate of the yield available.

Allied No. 34 is located directly across Gundry Ave. from the zone's discovery well, De Soto No. 1, but has about 500 ft. more formation open. Judging from performance of the other deep wells, Allied should expect 400 bbls. of 30 gravity clean oil.

Best among recent Wilbur zone completions was Atlantic Oil Co.'s Beauchamp No. 2, which was finished in the interval 3300-3465 ft. pumping initially 135 bbls. daily of 23 gravity oil cutting only 5.0%.

Other good shallow wells were obtained by Convoy Petroleum Co. and Cal-Mac Oil Co.; the latter a directionally drilled job bottomed under the cemetery.

Rosecrans Extension Outlook Is Mixed

Drilling developments in the South Extension of Rosecrans have so far failed to clarify the outlook of the area. At the intersection of San Pedro St. and Compton Blvd., two important wells are standing cemented preparatory to making tests which should, in some measure at least, answer vital questions as to trend of the fault believed to separate the extension from the main field and indicate possible easterly productive limits.

On the north side of Compton Blvd., Chicago Oil Co. set pipe at 7090 ft. after picking the top of the so-called Rowena zone at 7100 ft. Across the street to the south, Mission Oil Co. cemented at 7105 ft. Some observers are of the opinion that the wells do not correlate normally.

South of the extension discovery well, Howard Oil Co. completed No. 2 with perforations open between 7150 ft. and 7650 ft. flowing at an initial rate estimated at 150 bbls. a day. Other wells in this vicinity have shown a steady build-up in production after coming-in for low initials.

St. Anthony Oil Corp.'s Gordon No. 3 has been something of a jinx lately. Cored to 7750 ft., the well found some of the best sand yet uncovered in the south part of the field but had difficulty in shutting off water with 7 in. casing at 7314 ft. When a shut-off was finally obtained, the hole was cleaned out to bottom but the drill pipe "froze" making it necessary to redrill from 7350 ft.

At the north tip of Athens, Thorley Oil Co. is drilling Athens No. 12-1 near the 5500 ft. level without having encountered saturated oil sands. The company believes its best shot is for the deep zone below 7500 ft.

T. W. A. Completes Aliso Canyon Well

Tide Water Associated Oil Co. added another good producer to its list of Aliso Canyon wells with the completion of Porter No. 13. Bottomed at 5225 ft. in the discovery zone, 485 ft. of formation is open below the shoe of the 8⅝ in. casing at 4730 ft., from which the initial yield was 1760 bbls. a day of 23 gravity oil. Like other wells in this horizon, the gas flow was small, measuring only 385,000 cu. ft.

The company has two other wells drilling and is preparing to spud another pair, all on the Porter lease.

Master Well Spurs E. Coyote Operators

Success of Master Petroleum Corp. in obtaining nearly 400 bbls. a day after deepening an old well at a cost reported as only $3,000, has spurred two more operators into activity at East Coyote.

First to get under way was Hathaway Co. which is redrilling Anderson No. 5, an old well drilled originally by St. Helens Petroleum Co. After going out of the old casing at 2800 ft., new hole is being made at 3600 ft.

Re-entering active drilling ranks, Fred Garliepp acquired the ancient well known as Juanita Yorba No. 3 which he is redrilling at 3000 ft.

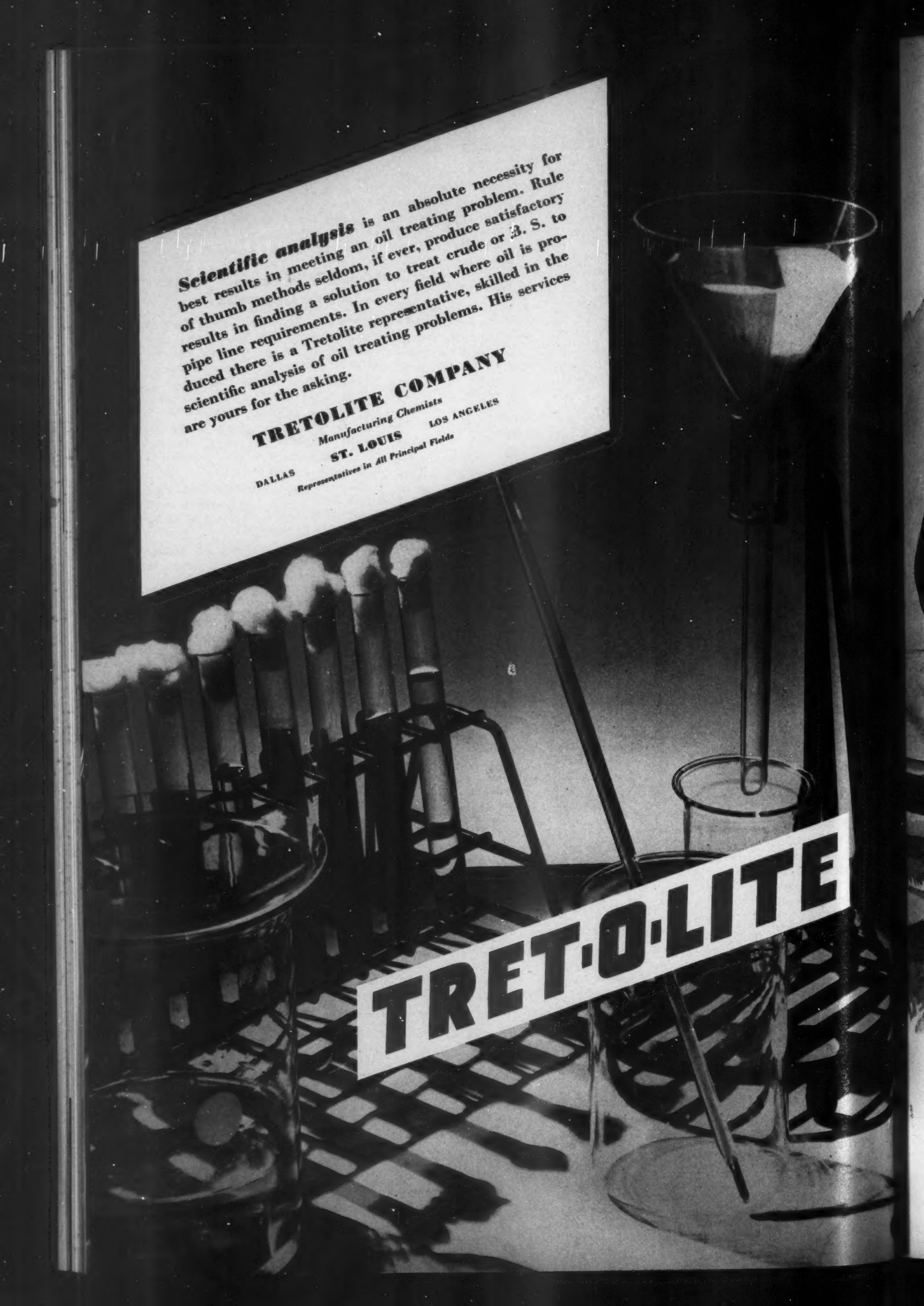
The cause of the activity was Master Petroleum Corp.'s phenomenal success in

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Athens	El Rey Oil Co., Westmore	1	2, 3-14	9063	Swabbing
	Melrose Pet. Co.	1	12, 3-14		Rig
Castaic	Havenstrite, R. E., Lincoln	1	16, 4-17		Rig
	Lang, Ed. W., Rupy	1	7, 5-16	781	Idle
	Worland, C. C., Jenkins-Owens	1	18, 5-16	1950	Idle
Chatsworth	Fernando Oils, Ltd., Holmes	1	18, 2-16		Grade
Domingues, West	Wood-Mellon Oil Co., Wood	1	31, 3-13	840	Drilling
Inglewood	Vanguard Oil Co., L.A.I.	1	29, 2-14	1041	Idle
La Habra	Union Oil Co., Sansinena	12	31, 2-10		Rigging up
Mint Canyon	Redwood Oil Co., Mitchell	2	22, 4-15	670	Drilling
Newhall	British-American Oil Prod. Co., Edwina	1	14, 3-16	4724	Prep. to deepen
	Canyon Oil Co., Sanborn	1	6, 3-16		Rig
	Consolidated Pet. Co., Needham	4	13, 3-16	4398	Idle
	Creighton Hammon Synd., C.H.	1	17, 3-16	385	Drilling
Palos Verdes	Rolling Hills Pet.	1	27, 4-14	6580	Idle
Puente Hills	Kasanke, J. F., Grazide	1	27, 2-10		Material
San Fernando	Parry, Geo. G., Moynier-Parry	1	6, 2-14		Rig
Sunland	Casa Grande Oil Co., Lopez-Lundy	1	1, 2-15	2320	Idle
West Whittier	Cal. Pico Oil Co., Beach	1	7, 2-11		Grading
	Orange County				
Buena Park	Tucker, H. M., Heath	1	34, 3-11	6625	Drilling
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5625	Prep. to deepen
Garden Grove	Bird & Chambers	1	31, 4-10	1250	Damaged Rig
Stanton	United Oil Co , Schimming	1	25, 4-11	8977	Drilling
Westminster	Plainview Oil Co., Hill	1	12, 5-11		Foundation

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Contra Costa	Tassajara Oil Corp.	1	9, 2s-1e	9777	Equip. removed
	Tassajara Oil Corp.	2	9, 2s-1e		Equip. removed
Monterey	Loma Grande Oil Co., Corey	1	23, 24s-10e		Rigged up
	Priest Valley Pet. Co., Greve	1	22, 20s-12e	2650	Drilling
Sacramento	Amerada Pet. Corp., Carpenter	1	20, 4n-3e	4354	Compl. shut-in
Solano	Calaveras Cement Co., Calaveras-Elliott	1	30, 4n-3e	4135	Compl. shut-in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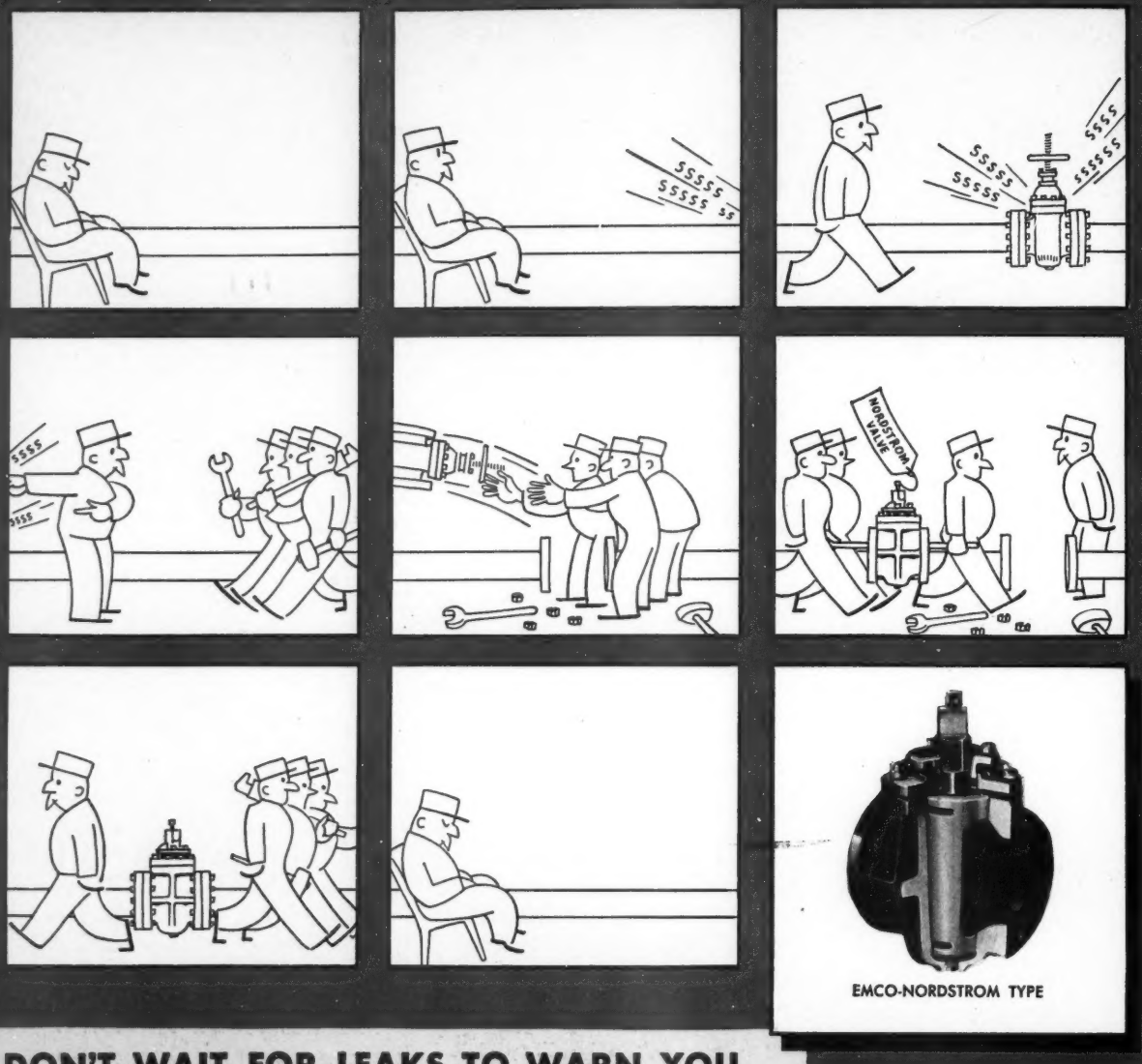

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the old Chiksan Oil Co. Lemke No. 1 from which it recovered a fish, deepened approximately 90 ft. and recompleted after cementing a blank liner and gun-perforating 30 ft. above bottom at 4240 ft. Lemke No. 1 is located 1200 ft. south of Golden Ave. and 1450 ft. west of Valencia St. near the Anaheim Union Water Co.'s reservoir site.

In the near future Graham & Loftus, Kern Oil Co., Master Petroleum Corp. and Jack Bryan plan to do work in the area.

Batholomae Oil Corp., only active operator in the westerly section of the field, is reported drilling Stern No. 9 below 5100 ft.

West Montebello Activity Diminished

With the realization that 8-3 Zone production will be found only in a limited area, activity at West Montebello has diminished to a relatively low level. At the crest of the anticline, several good wells have been obtained at depths as low as 7890 ft. but at down-structure locations results have been unsatisfactory.

First abandonment in the field was Columbia Oil Co.'s Crawford No. 19, which deepened from the 8-2 Zone to a final depth of 8154 ft. and helped to create the present deepening program by encountering sand bodies below the then-known horizons. Production tests proved the lower zones wet at this location and the hole was junked during efforts to recomplete in the old sands.

Brightest spot in the picture is Standard Oil Co.'s Braun 7 which was recompleted for 1600 bbls. of oil and 2,130,000 cu. ft. of gas after deepening to 7797 ft.

U. P. Finishes 5 Wilmington Wells

Of the seven new wells placed on production in the Wilmington field during the past two weeks, five were completed by Union Pacific Railroad; the exceptions being Hancock's Harbor A-27 and Continental Corp.'s Flood Control No. 3.

Three of the U.P. wells were finished in the Terminal Zones, one in the Ranger and one in the Ford. All were good clean oil producers with yields ranging from No. 139's Ford Zone 275 bbls. to the big potentials of the Terminal wells.

Hancock Oil Co. completed A-27, with both Terminal Zones open, flowing 1269 bbls. a day through a 40/64 in. bean while Continental Corp. continued its amazing Ranger Zone record by bringing in No. 3 for 590 bbls.

Royalty Service Corp. is having remarkable success in redrilling and recompleting its old wells in the Wilmington Town Lot area, the latest of which is Santa Fe No. B-4, located a block north of Anaheim Blvd. on McFarland Ave. Redrilled from 2735 ft. to the old bottom at 3620 ft. and finished with a gravel packed liner, the well initialled 420 bbls. on the pump.

H. B. Tideland Well Pumps 765 Bbls. Daily

The largest Huntington Beach completion in some time was obtained last week by Southwest Exploration Co. in State Tideland well No. 27 when, after pumping in, a high gauge of 765 bbls. was registered for a 24 hour period. The well is open in 900 ft. of formation to bottom at 5070 ft.

Surf Associates, Inc. is preparing to drill its State No. 1 and The Termo Co. is redrilling an old well directing the hole under the tidelands.

Activity on the flat east of the city is at a stand-still after both Desert Glow Oil Co. and Johnston, Owens & Baker failed to find good sands to their respective depths of 3765 ft. and 4005 ft.

No wells have been drilled at Five Points since the completion of the 75 bbl. Clear View Oil Co. No. 1.

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Dominguez Outpost Sets Water String

Gibralter Drilling Corp. is setting water string over the Eighth Callender Zone in its Dominguez field outpost at the southwest corner of Victoria Ave. and Avalon Blvd. Hole has been bottomed at 8045 ft., 70 ft. below the cementing point. Though many streaks of fair oil sand were cored in the Sixth and Seventh Zones, the stringers at present bottom are said by the operators to be the best yet encountered.

R. E. Havenstrite is preparing to test well No. 3 on the Larronde lease after bottoming at 7541 ft. and cementing casing at 7015 ft. The project is the most westerly on the property.

North of the Larronde wells, Union Oil Co. is about ready to complete Austin No. 1 in which the water string was set at 6970 ft. indicating a structural position approximating that of Larronde No. 1.

Union's last producer, Callender No. 76, is now pinched back after establishing a potential of nearly 1000 bbls. a day on gas lift.

Cal-Pico Starts Pico Wildcat Well

Cal-Pico Oil Co. is reported to have started clearing the ground for its wildcat well on Durfee Road approximately 2200 ft. north of Beverly Blvd. near Pico. W. L. Brown will be in charge of the drilling while the engineering and geology will be done by Bradford Bishop who also obtained the leases.

Basin Wildcat Activity Told

More than at any other time in recent years have the wildcat wells of the Los Angeles Basin captured the attention of the California Oil Industry.

Perhaps accorded the most publicity was British American Oil Producing Co.'s Edwina No. 1 in sec. 11, 3-16 near Newhall. Tests of showings in the Modelo from 4624 ft. to 4725 ft., resulted in but little fluid recovery and the liner was pulled to deepen. Because of the strict secrecy maintained during the trial many extravagant rumors flourished until the facts were first published in California Oil World's weekly News Service.

El Rey Oil Co.'s project at the northwest corner of Western Ave. and Imperial Highway tested wet, successfully recemented the 7 in. casing at 8632 ft. With compressor installed, production on gas lift is as yet small but is showing a tendency to increase. Plug is at 9000 ft.

The R. E. Havenstrite organization is preparing to drill its important test of the Del Valle structure near Castaic in sec. 16,4-17. The geology of this play was discussed at length in the First May issue of this publication.

Union Oil Co. spudded-in its Sansinena No. 12, sec. 31,2-12, in an attempt to locate a new field between the old Whittier production and Shell's shallow Puente field. The well is located south of the Whittier fault.

Hoping to find an accumulation against Nigger Slough fault, Wood-Mellon Oil Co. is drilling north of Victoria Ave. and east of Figueroa St. Surface casing has just been cemented at 1000 ft. The location is about a mile west of Dominguez production.

At the northwest corner of Pierce and Gladstone Sts. in the San Fernando area, Geo. G. Parry has derrick erected for Moynier-Parry No. 1 on a structure said to have been mapped years ago by U.S. G.S.

West of Buena Park in sec. 34,3-11, Harrison M. Tucker is drilling below 6625 ft. with only a few gas showings to date. Because of oil circulated during fishing operations at 6200 ft., many exaggerated tales were recently told of this well.

Near the cross-roads of Stanton in sec. 25,4-11, United Oil Co. is drilling Schimming No. 1 at 8977 ft. after topping Repetto at 8650 ft. A mile and a half southeast, Bird & Chambers pulled in their derrick while trying to loosen drill pipe stuck on bottom at 1250 ft.

Near the east quarter corner of sec. 12,5-11, Plainview Oil Co. started rig foundations but has temporarily suspended work.

With bottom at 5625 ft., Milton N. Thompson's wildcat at Costa Mesa ran an electric log and is reported to be preparing to set casing at 5000 ft. for a production test. Opinions of experts vary as to the value of the showings.

E. F. Stella's latest Puente Hills venture, McDermont No. 1 in sec. 5,3-8, is bottomed at 1050 ft. and with casing cemented at 931 ft. is on production test with estimates unavailable. A bailing test with bottom at 960 ft. resulted in 20 gravity oil entering the hole at a 2 bbl. per day rate.

Republic Will Test New Gaviota Structure

On an untested structure four miles west of Gaviota Station on the Southern Pacific coast line in Santa Barbara county,, Republic Petroleum Co. has derrick erected for what is considered the most important recent Coastal wildcat. Located on a 20,000 acre lease from the Hollister Ranch Co., the well will be known as Republic-Hollister No. 1.

Republic's venture is in the east half of projected sec. 36,5-33, about one and one half miles east of the group of wells drilled following the discovery of gas in

Western Gulf Oil Co.'s Hollister No. 1 more than a decade ago.

Though testing a separate anticline, it is probable that Republic-Hollister No. 1 will find a geologic section similar to that encountered in wells to the west where a 100 ft. Vaqueros zone was cored above the top of the Sespe at 3310 ft. by Wilshire Oil Co. This horizon caused a blow-out in Western Gulf's No. 1, the first well to test it, in 1929 and produced a small amount of gas eight years later in Gaviota Oil Co.'s Hollister No. 1. In 1938 Wilshire Oil Co. was unable, however, to obtain sufficient gas from the Gaviota well to fire its boilers.

That the Vaqueros is not the ony possible producing horizon was demonstrated by both Western Gulf No. 1 and by Wilshire No. 1, each of which found oil showings in the Sespe. The latter well made formation tests at intervals to bottom at 4600 ft. but recovered no appreicable quantity of oil. Generally speaking, the oil possibilities of the Gaviota area may be said to be similar to the Elwood and Capitan fields a few miles to the east.

Nomads See Film On Alaskan Drilling

A complete pictorial history of the Alaskan drilling operations of the Iniskin Drilling Co. was given at the regular monthly meeting of the Nomads at Los Angeles, May 8. Kodachrome moving pictures accompanying a lecture by R. E. Havenstrite, president of California Western Oil Co., brought out the difficulties encountered in drilling the test well on the west coast of Cook Inlet in southern Alaska and pictured much of the rugged but beautiful scenery in that territory. The fishing scenes made many of the audience want to get their rods and strike right out for Alaska.

Another guest of honor at the dinner was Hale B. Soyster, chief engineer of the petroleum division of the U. S. Geological Survey, Washington, D. C. Guests from other countries included the following: F. W. van Bilderbeck of B.P.M.; B. Bongers of U.B.O.T. from Trinidad; Erno Bonebakker of B.P.M.; J. Domeroq of California Arabian Standard; O. A. Grainger of K.T.O. from Trinidad; G. W. Van Hillo of C.P.C. from Colombia; Karl Jauman of Attock Oil Co. from India; J. McPherson of California Arabian Standard; Clarence Ochs of Ecuadorian Oilfields, Ltd., from Ecuador; Jess Rector of Ganzo Azul from Peru; Antonio Sanz-Agero of Texas Petroleum Co. of Venezuela; George Schepers of N.K.P.M. from Sumatra; J. A. Thornton of B.P.M.; E. L. M. Trafford of B.P.M.; J. W. Burns of C.P.C. from Cucuta, Colombia; and L. C. McMorris of K. T. O. from Trinidad.

A.P.I. Production Division Appoints Two Committees

The 1940 Central Committee on Drilling and Production Practice of the American Petroleum Institute's Division of Production has been appointed by George A. Hill, Jr., chairman of the division's general committee, C. A. Young, secretary, has announced.

A main subcommittee of this committee, the Topical Committee on Drilling Practice, has been appointed with B. H. Robinson, General Petroleum Corp. of California, Vernon, Calif., as national chairman. Chairmen of the California District and other subcommittees are: T. A. Atkinson, General Petroleum Corp. of California, Los Angeles; San Joaquin Valley Section, C. E. Peavy, vice chairman, Shell Oil Co., Inc., Bakersfield, Calif. Rocky Mountain District, H. F. Davies, The California Co., Denver. Special Subcommittee on Drilling Contract Form, J. E. Brantly, Drilling and Exploration Co., Inc., Los Angeles.

Well Temperature Data Features Leakage Study

Subsurface temperature data has an important bearing on the study of subsurface leakage of fluid from gas and oil wells, according to a report recently published by the U. S. Bureau of Mines. The report, written by M. A. Schellhardt, E. J. Dewees, and W. H. Barlow, includes data from a series of tests on a specific Texas gas well which experienced an unexplained decline in wellhead pressure.

E. R. Smith to S. A. For Lane-Wells Co.

E. R. Smith, Lane-Wells Export Sales, Los Angeles, will leave for a sixty-day trip through the Colombia, Venezuela and Trinidad Oil Fields, immediately following the International Petroleum Exposition at Tulsa. Mr. Smith will first visit the company's New York office and then embark for Miami. The entire trip will be made by air and the return will be through Central America and Mexico.

Pathfinder Increasing Refinery Capacity 25%

Installing a larger pipe furnace and adding larger capacity hot oil pumps at its refinery on Spring St., off Lakewood Blvd., near Signal Hill, Pathfinder Petroleum Co. reports increasing business necessitates a 25 per cent increase in plant capacity. While the bulk plant, sales and advertising offices remain at 3970 Medford, the general offices are being moved to 811 West Seventh St., in Los Angeles.

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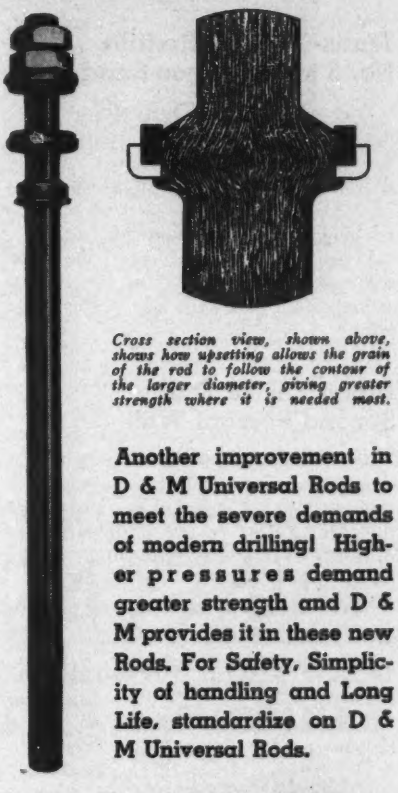

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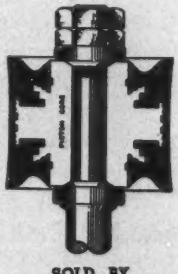

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Coastal District

Superior Oil Spuds Huasna Valley Well

Most important well drilling in San Luis Obispo county is Superior Oil Co.'s Tar Springs No. 1 in Huasna Valley. Located in sec. 24,32-14, the project is drilling in hard shale at 989 ft. The hole will be carried as deep as necessary for an adequate test, according to company officials.

Trans-Oceanic Redrills No. 5 to Vaqueros Sand

Trans-Oceanic Oil Corp., still attempting to make a producer of M'divani No. 5, plugged the 2020 ft. hole to 150 ft. and redrilled to 1790 ft., setting casing at 1770 ft. The pipe tested wet on the first job and is standing recemented.

Well No. 5, located near the bluff overlooking the ocean, is the lowest structurally of all wells east of the major fault.

Union Oil To Drill Second Pezzoni Well

After finding the Sisquoc lying directly on the Franciscan Schist basement in Pezzoni No. 1, Union Oil Co. abandoned the well at 2242 ft. and is preparing to drill No. 2 approximately 570 ft. to the north.

Although information has been withheld as to the exact point of the Sisquoc-Franciscan contact, it is believed that the basement was penetrated no great distance. The second try is located to the north seeking an overlap of the Sisquoc over the Monterey and against the basement. Both wells are in sec. 33,10-35, southwest of the Santa Maria Valley field.

Santa Clara Drills Second Shiells Well

Santa Clara Oil Co. is below 1785 ft. in its second well on the Calumet property in the easterly section of the old Shiells Canyon field. The new project adjoins No. 15 which Santa Clara recently deepened to cause the greatest sensation in recent Ventura county history with a yield at first estimated at 300 bbls. a day. The producer is bottomed at 3225 ft. and at present is making a little more than 100 bbls. a day of 35 gravity oil on the pump.

On the south flank of the field, El Rancho Oil Co. is drilling Elkins No. 4 at 788 ft. according to last reports. Located practically on the northerly property line, the well should make a good producer.

Piru Well Finished By Bolsa Chica Corp.

Bolsa Chica Oil Corp. completed its outpost well, Hidden No. 1, in the Temescal field pumping 50 bbls. a day of 23 gravity oil cutting 20.0%. Located in sec. 5,4-18, the hole was carried to 3691 ft. and plugged to 3355 ft. where a perforated liner was landed to produce the interval below the water string at 3195 ft.

Hidden No. 1 is very important to Bolsa Chica as it adds considerably to the company's proved acreage and, in the course of time, will prove a real contribution to earnings.

On the proved Snow lease, Bolsa Chica is preparing to drill Well No. 6.

The Temescal field, which lies about three miles north of Piru, is controlled entirely by Pacific Western Oil Corp. and Bolsa Chica Oil Corp.

Ventura Outpost Stands Suspended

After making unsuccessful production tests at several levels above total depth of 9500 ft., California Alliance Oil Co. suspended operations in Hartman Ranch No. 2 to await results of other north flank wells now drilling. The company's Schmidt No. 1, west of the Avenue, is reaming at 7650 ft.

British American Oil Producing Co. is drilling Hartman No. 10 at 5400 ft. and is below 7000 ft. with Barnard No. 1, the latter an offset to California Alliance Petroleum Corp.'s Hartman Ranch No. 1.

Lloyd Corp., Ltd., No. 5, in the northeasterly section, is drilling below 6500 ft.

Tide Water Associated Oil Co. and Shell Oil Co. continue to contribute the bulk of the field's activity; the former company having ten projects under way and the latter half a dozen.

California Lands Drills New Santa Maria Well

California Lands, Inc., successful oil operating subsidiary of Bank of America, has derrick up for MacDonnell No. 2, a new well in the northwest quarter of sec. 28,10-34 in the central portion of the Santa Maria Valley field. The location is such that Pacific Western Oil Corp. will probably be forced to drill a northerly offset on its Carranza lease.

In the northwesterly section, Fred E. Cole has had trouble in eliminating water in Giacomini No. 1. With bottom at 4805 ft., the 6⅝ in. casing is standing recemented at 4640 ft.

Union Oil Co., largest buyer in the Santa Maria district, announced a new price schedule on May 18, according to which Santa Maria Valley crude brings from $.42 for 14 gravity to $.46 for 17

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
Santa Barbara County					
Betteravia	Union Oil Co., Pezzoni	1	33, 10-35	2242	Abandoned
	Union Oil Co., Pezzoni	2	33, 10-35		Grading
Carreaga	Arnold Oil Corp., Arnold-Apache	2	8, 8-33	6825	Idle
Gaviota	Republic Pet. Co., Hollister	2	35, 5-33	3200	Idle
Goleta	Hamilton, W. C., Hollister	1	3, 4-29	1345	Idle
Lompoc	Sun-Bell Drilling Co.	1	28, 8-34	3064	Idle
Summerland	Oil Group, Inc., Hyland	1	16, 4-26	2206	Cleaning out
San Luis Obispo County					
Arroyo Grande	California Fuel Oil Co., Elberta	3	5, 32-13	2414	Drilling
	Holly Oil Co., Meherin	1	7, 32-13	4072	Abandoned
Elk Horn	Calif. Pet. Prod., Irons	1	19, 10-24	2527	Bailing
	Burrhus, V. E., Haberkern	1	21, 32-22	2730	Idle
Huasna	Superior Oil Co., Tar Springs	1	24, 32-14	540	Drilling
Ventura County					
Conejo	Sulphur Springs Oil Co., Janss	1	33, 2-19	3000	Idle
Moorpark	Shafer, Frank, et. al.	1	30, 3-19	736	Idle
Santa Susana	K. C. Oil Co., Marr	1	32, 3-17	1014	Idle
Sespe	G. E. Development Co.	7	13, 4-19	750	Drilling
	Merchants Pet. Co., Cochrane	8	1, 4-20	2260	Cleaning out
	Hall, Henry Lynn, Tar Creek	1	35, 5-19	1275	Idle
	Renard Oil Co.	1	6 4-19	1100	Idle
	Rio Hondo Oil Co., Cosby	1	14, 4-19	1225	Drilling
Simi	Levesque, G. M., Robertson	1	17, 2-18	2325	Idle
South Mountain	Albatross Oil Co., Schiefferle	1	17, 3-20		Rig
	Mallon, Felix, Richardson	1	14, 3-21		Rig
Sulphur Mt.	Madison Oil Co.	1	24, 4-22		Rig

gravity. In the old Santa Maria-Orcutt fields prices range from $.60 for 16 gravity oil to $.86 for 26 gravity.

Liquefied Gas Assn. Holding First Exposition

Sponsored by the Pacific Coast Section, Liquefied Petroleum Gas Association, the first annual Pacific Coast Liquefied Petroleum Gas Exposition will be a feature of that association's two-day meeting scheduled for June 27 and 28 at the Municipal Auditorium, Santa Barbara, Calif.

According to C. L. Parkhill, chairman of the Pacific Coast Section, interest in the meeting and exposition has crossed sectional boundaries and is assuming national significance both from the standpoint of exhibits and attendance. While exhibit privilege is limited to association members, the meeting and attendance at the exposition is open to all interested parties. Since the liquefied petroleum gas industry, its growth and future is becoming increasingly important to such allied industries as petroleum, natural gas, natural gasoline and their related appliance and equipment fields, a particular invitation is extended to men in these industries.

The exposition will feature a complete cross-section of the industry's latest equipment, domestic appliances and fuel consumption applications. The meeting will feature a strong program with the following papers to be presented: Thursday, June 27, "The Probable Trend of the New California Accident Commission Code," "Successful Appliance Sales, Service and Installation Methods," and "Transportation, Storage and Handling of Butane." Friday, June 28, "Problems of Pumping L.P.G.," "The American Gas Association Testing Laboratories and their Relation to the L.P.G. Industry," "Building Fuel Load through Space Heater, Water Heater, Refrigerator and Range Sales."

No admission or registration fees will be charged. John H. Kunkel, Sectional Secretary, 1625 S. Alameda Street, Los Angeles, Calif., is in charge of the event. He will supply full details to those interested in attending.

R. P. McLaughlin Speaks At Coast District A.I.M.E.

The May meeting of the Coastal District of the Southern California Section, American Institute of Mining and Metallurgical Engineers, was held at Pierpont Inn, Ventura, Calif., May 8. R. P. McLaughlin, general manager of Burnham Exploration Co., was speaker for the evening and discussed "Development of Petroleum Engineering in California".

Mr. McLaughlin, who was first State Oil and Gas Supervisor, reviewed the development of drilling practices and described the gradual assumption of responsibility and authority by technical men in the petroleum industry. Many amusing anecdotes relating to early-day experiences were told by the speaker.

Forty-one members and guests were present. Carlton Beal, district chairman, presided.

Axelson Bulletin

"Axelson Has What It Takes" is the title of a new publication now in the course of distribution by Axelson Manufacturing Co. Through its pages, the reader, regardless of his geographical location, takes a trip through both Axelson plants—Los Angeles, wherein he views the manufacture of Deep Well Plunger Pumps—St. Louis, to witness modern Sucker Rod production practices.

Your Axelson man will welcome the opportunity of pointing out items of interest in your copy, says the company.

Meeting in executive session recently, the subcommittee of the House Merchant Marine and Fisheries Committee investigating oil tankers heard several officials of oil trade associations.

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LAUGH THIS OFF

If, as so many people contend, there is no such place as hell, then where did the stock market go the other day?

It's the most aggravating thing that we keep wishing our stocks would go up and they go down, and we keep wishing our golf score would go down and it goes up.

Speaking of golf, by the way, we are happy to relate that the Long Beach pumper who was reported missing early last week was found yesterday, according to **Perry Kilsby.** He was just awaiting his turn on a municipal golf course.

And it has been estimated that if all the oilmen who play golf were laid end to end they would lie indefinitely.

"Isn't that guy's cussing terrible?" asked **Dub Russell** out at Oakmont Club, and **Ed Leabow** replied, "Yeah, he sure don't put much expression in it."

On the subject of profanity, we know of nothing more profane than the honk of a horn.

With all the new transportation devices coming along, and the growing obsession for speed, there doesn't seem to be anything rational about human behavoir any more. **Joe Scanlon,** the Fillmore Hibernian, is distinctly of the belief that it won't be long until we can travel without leaving home.

Home being that thing to which you come back every once in a while to get the telephone messages that tell you where to go next.

And when **Bill Ackerman** was orating on the subject of modern travel, and rejoicing over the convenience of going to sleep in San Francisco and waking up in Los Angeles, **Bill Saul** remarked, "Aw, g'wan, nobody ever wakes up in Los Angeles."

On the other hand, when **A. C. Galbraith** registered at the Fairmount Hotel in San Francisco, and was offered a room on the twelfth floor, he remonstrated, "Okay, I'll take it. But if anybody calls for me tell them I'm out of the city."

Now diverging with the usual abandon, we were visiting an art exhibit at a local institution the other day, and one especially atrocious piece of modernistic painting had a sign on it reading, "Please do not touch with the hands." Some wag had added underneath, "Use an axe."

According to **"J. B." Nelson,** a Torrance gauger threw quite a party the other night to celebrate the tenth anniversary of his wife's thirtieth birthday.

And you have perhaps heard that the longest ten years in a woman's life is between the ages of twenty-eight and thirty.

Jim Goodale, interviewing an applicant for a job, asked, "Do you ever indulge in intoxicating liquor?" Replies the hopeful one, "Before I answer that I'd like to know if it's a question or an invitation."

Incidentally, what some people do to the king's English is nothing to what they do to his Scotch.

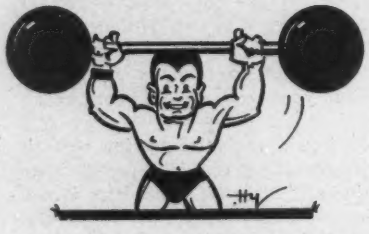
It's well to remember, however, that a guy who gets loaded too often is almost sure to get fired.

There may be no truth in this one, but we are told that a local paper was recently reporting the funeral of an old time oil man on the same day that a bad factory fire occurred. The two items somehow became mixed, and the story wound up about like this: "The silent form was lowered into the grave—then, suddenly flames shot high into the air. Nobody was very much concerned, however, as it was an old hulk that had long been an eyesore to the community."

And **Ralph Rosborough** says camping would be a lot more pleasant if people wouldn't burn the scenery when they get through with it.

In conclusion, **Max App** tells a yarn about an Oklahoma boy who came to California and made good. He was actually elected to the state legislature, and of course sent home news of his success. Paw read the epistle over, then stroked his whiskers and ejaculated, "Doggone, Joady's in the state legislature, but it don't say what for."

STRENGTH



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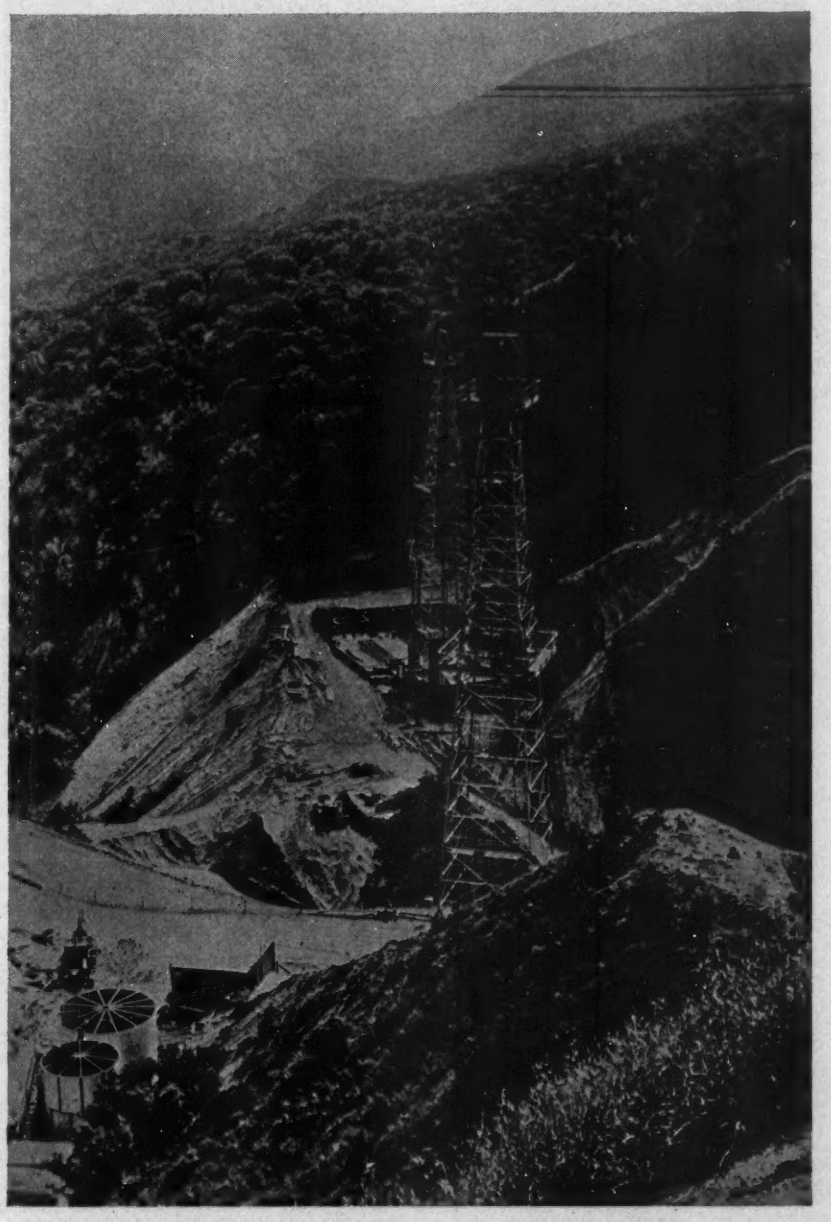
Tide Water Associated to Operate Pacific Western and Getty Properties

William F. Humphrey, president of Tide Water Associated Oil Co., reported to the stockholders that the company has executed agreements with Pacific Western Oil Corp. and George F. Getty, Inc., effective May 1, under which Tide Water Associated Oil Co. will operate all of the oil and gas producing properties of those companies in the State of California under a fixed fee and direct operating cost arrangement, and under separate agreements Pacific Western Oil Corp. and George F. Getty, Inc. will join with Tide Water Associated Oil Co. in a program for acquiring and developing prospective oil lands in California. Under the agreement Tide Water Associated Oil Co. will have a 75 per cent interest and each of the other two companies named will have a 12½ percent interest in all properties acquired pursuant thereto, and the companies will share in like proportions in the cost of geological, geophysical, and land department charges of Tide Water Associated's Western Division. Operations and acquisitions of properties will be under the jurisdiction and management of Tide Water Associated Oil Co. Mr. Humphrey explained that these arrangements should prove mutually profitable to the stockholders of all companies concerned as it will result in lowering operating and exploratory costs to all parties involved.

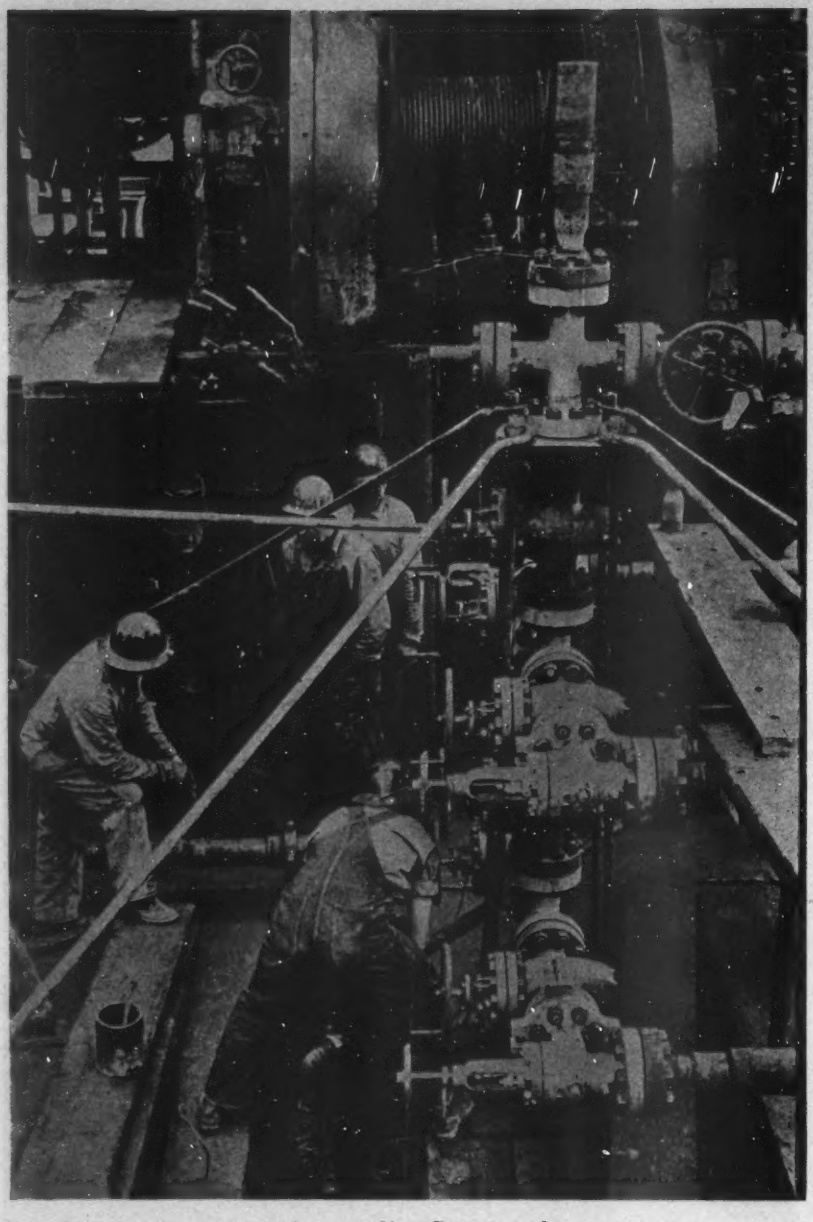
At the annual meeting of the stockholders of Tide Water Associated Oil Co., held in New York early in May, the eight directors whose three year terms of office expired were re-elected to serve for three more years. J. P. Edwards was elected a director to fulfill the unexpired term of the late Charles M. Cadman, a director who died about a month ago. George J. Hanks was elected a director for two years to fulfill the unexpired term of Noel Robinson who resigned early this year. The eight directors who were returned to office were Carl H. Beal, Adolphe Boissevain, Frank Haskell, John Hertz, Severance A. Millikin, R. B. Pringle, Paul Shoup, and Elisha Walker.

A record attendance was reported at the meeting with a total of 6,060,046 shares being represented in person or by proxy, which is more than 88 per cent of the 6,871,311 shares of the company's stock entitled to vote. All of the shares represented at the meeting were voted in favor of the management and for the directors named by the Management's Proxy Committee. This vote is the highest ever polled for the management in the company's history.

In his address to the stockholders President Humphrey expressed the appreciation of the management for the confidence of the stockholders signified by the large representation of proxies which he said is most unusual for corporations with such a large number of stockholders, indicating a real interest on the part of the stockholders in the affairs and operations of the company. In discussing market conditions, Mr. Humphrey stated "In August 1939, a two weeks complete shut down of production of crude oil in some of the larger Mid-Continent fields required refiners to draw on their stocks, and this circumstance, together with increased demand for gasoline, kerosene, and heating oil, stimulated market prices, and your company was able to report that the earnings of the last quarter of the year amounted to $4,578,653 and that the portion thereof applicable to the common stock amounted to $4,016,153, or 63 cents per share. However, "the unusual demand for heating oil and kerosene required refineries to be operated at capacity and produce, at the same time, surplus gasoline, inventories of which were increased to such an extent that a weakening of the market price of gasoline resulted. While



Tide Water Associated Oil Co.'s Aliso Canyon "diggins".



Tying down an Aliso Canyon producer.

it is difficult to forecast the full effect of this condition on the earnings of petroleum companies, many fear that the rate of earnings of the last quarter may not be maintained throughout the present year, and there is some justification for this fear. From the viewpoint of earnings, the last quarter of 1939 was the best last quarter of any year in this company's history. The month of January, 1940 was, likewise, the best January the company has ever enjoyed; and the earnings of the first quarter of this year are far ahead of any first quarter earnings of any previous year. However, according to present indications the company may not maintain this record in the immediate future, although we are anything but pessimistic. We all know that experience is a great teacher, and we hope that the recent rapid increase in gasoline inventories due to the great demand for kerosene and heating oil, may prove a valuable lesson to the industry. Probably modification of refinery facilities and their operation will result in more flexibility in operations and permit a better balance between the production of heating oil and gasoline and the demand for these products."

Mr. Humphrey also mentioned that the company has secured from the Houdry Process Corp. a license to use the Houdry Catalytic Process at its Bayonne Refinery and to sell products produced therefrom.

In this process a catalyst is utilized in the reaction to secure a more complete conversion to higher yields of gasoline of improved anti-knock quality and to permit the accomplishment of these results at lower temperatures and at much reduced pressure compared to the previous thermal cracking processes. The catalyst is periodically revivified in place and is neither destroyed nor does it enter into the final products, but merely promotes and accelerates the reaction. The new plant will provide for 15,000 barrels per day in the catalytic cracking cases and will largely replace present facilities. It is not intended that the overall output of gasoline at the Bayonne Refinery will be substantially increased, and the installation is based entirely upon the economic benefits to be obtained from processing the same total volume of crude oil through the refinery and obtaining therefrom a greater yield of a still further improved quality of gasoline at a lower cost.

Mr. Humphrey stated that "notwithstanding the production of 21,032,000 barrels of crude oil during the year 1939, by new discoveries and extensions of existing producing properties, the company added an estimated total of approximately 53,000,000 barrels in its estimated reserves, and that the company's present indicated crude oil reserves were estimated to approximate 375,000,000 barrels at the beginning of this year. Since release of the annual report to stockholders a few weeks ago, the company's prospecting and developing efforts have been further rewarded by the discovery of a new, deeper, rich oil and gas zone in the Aliso Canyon Field in Southern California, a field first discovered by this company in the year 1938, and by a new discovery of oil and gas in the Delta Farms lease in the Delta areas of Louisiana. While these recent discoveries give every indication that they are of great value, especially the deep zone in the Aliso Canyon Field, it is impracticable at this time to estimate the volume of oil and gas so added to the company's reserves."

Institute's Mid-Year Preliminary Program

Announcement of the preliminary program for the American Petroleum Institute's Tenth Mid-Year Meeting, scheduled for May 27 to 30 at Fort Worth, Texas, has revealed that Congressman Bruce Barton, of New York will be the guest speaker. Congressman Barton, who is also president of Batten, Barton, Durstine & Osborn, Inc., New York advertising agency, is scheduled to speak at a luncheon general session to be held at noon Wednesday, May 29 in the Venetian Ball Room of the Blackstone.

The Economic Significance of Safety

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A. P. I. Midyear Meeting 1940

R. B. Roaper*

For many years it has been my privilege to attend a number of American Petroleum Institute meetings similar to this one. During these meetings numerous papers have been read, many speeches given, and considerable discussion held on the subject of safety. During this period we have seen organized safety work progress from an emotional approach through successive stages of physical inspections to present educational procedures. Our discussions have paralleled this development. Back of it all we have recognized, or have felt, that our safety program does have a sound business basis. However, there has not been much said formally about this particular aspect of it. It is my intention on this occasion to leave the customary avenue of approach, and to emphasize the importance of our safety program by a different route. It is not my purpose to underrate the humanitarian aspect of accident prevention, and I wish to emphasize that it is increasingly important that we follow on some of the human approaches to the problem, such as our educational endeavors with respect to the individual worker. A genuine interest in a man's welfare is a necessary part of leadership which, we must admit, is an indispensable tool in the furtherance of good industrial relations.

In substance, my thesis is that safety in itself is good business, that it is an indispensable part of profitable operations, and that the satisfaction of human needs and desires is an inevitable by-product of accident prevention. We are in business to make money. Stockholders have a right to expect a reasonable return on their investment. Employees have a right to a fair return on the expenditure of their labor, and the public expects quality products at reasonable prices. It is axiomatic to say that these things can be achieved through efficiency in operations. It is not appreciated generally that a well-planned well-directed safety program can, and will, make a definite contribution to increased efficiency.

ABSTRACT

The central theme of this paper is that safety is good business. Profitable operations naturally depend on efficiency of equipment and personnel. An effective accident-prevention program concentrates its attention not only on the maintenance of equipment and safe working conditions, but also on the training of employees in the efficient performance of work—realizing that the prevention of accidents and the building of morale follow as natural by-products. Several examples given by the author indicate how money savings can be effected and increased returns on investments realized, particularly through securing individual company credits on the base rates for compensation insurance as a result of improvements in accident experience.

Compensation-Insurance Reduction

Recently all of us have become increasingly aware of the importance placed upon social legislation throughout our country. One of the earliest forms of social legislation was the workmen's-compensation act, some form of which has been adopted by practically every state in the Union. Even though the state law may not compel the purchase of an insurance policy to cover this risk, it is usually good business to do so. Although industry cannot, and would not, want to reduce the benefits prescribed by these laws, it substantially can reduce insurance-premium payments by controlling the number and severity of accidents sustained by its employees. If we do this, we are able to reduce our operating costs in direct proportion to the efficient manner in which we run our business.

For purposes of illustration, I should like to refer to the Texas workmen's-compensation act because of the fact that I am more familiar with the terms of this act than with similar acts in force in other states. It is probable that the same general conclusions may hold if applied to these other acts. In Texas the base rate for liability insurance under the compensation act for any given occupation within the oil industry is established annually by the State Insurance Commission. This figure is derived by considering the accident experience and its total cost for that occupational phase of the oil industry. The rates in each case are determined by actually computing the total annual expense involved in paying for injuries that occurred and in paying for the administration and sale of the various compensation policies to the purchasing oil companies. The general administrative expense for the average insurance company, in the main, will remain constant. The variation in rate, therefore, will lie in the cost of paying accident claims. If a given occupation throughout the year is conducted safely and accident claims are few, the rate established by the insurance commission will be lowered. In computing the base rates the experience of the entire industry is considered, rather than the individual record achieved by each operator. Certain credits varying directly with the accident experience of the individual company are allowed. For example, one company which has an excellent record in drilling operations receives a credit of 67.4 per cent of the base rate; in other words, the actual premium rate which this company pays is 32.6 per cent of the base rate. The application of the law also penalizes companies which have an unsatisfactory accident experience, and some companies have had to pay

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annual penalties in the form of increased premium rates over and above the base rate. The establishment of an individual premium for any one company resolves itself, in the final analysis, to a comparison of the accident experience of that organization with that of the oil industry operating in the state. It can be seen that individual initiative and enterprise will be rewarded by rate reduction. Such rate reduction can be attributed directly and specifically to an effective accident-prevention effort.

Improved Drilling Records

Although drilling activities today are assessed one of the highest premium base rates in the oil industry, based on accident experience, this rate need not necessarily be any higher than the average base rate for all operations in the industry. There are cases on record of drilling rigs operating continually over a period of years without a single disabling injury. There are other instances of individual drillers who are proud of the fact that they have supervised crews for years without a single member of their crew sustaining a disabling injury.

Let us review the case of a particular area in the operations of a certain company last year. There was an average of approximately 125 men engaged in drilling work, with an annual payroll in excess of $300,000. The base premium rate for compensation insurance on drilling activities that year was $11.36 per hundred dollars of pay roll. On this basis the premium cost normally would have been more than $38,000. The accident experience for the previous few years had been such that the insurance commission permitted that company an effective rate of only $3.68. The amount of direct saving on insurance premium alone in this instance was almost $26,000.

Naturally you will be curious as to the amount of money expended in formal safety work that made this saving possible. In this company it was calculated that $6.78 per employee was expended during the year for the maintenance of a safety department. In the illustration I have given, about $850 was spent in formal safety effort in this particular area. Adding to this an almost equal amount of company benefits received by the injured men, we find that the cost of safety was less than $1,650. Actual calculations, covering the illustration given and including additional voluntary payments, show that a profit of 1,470 per cent was made on the investment. Stated another way, each man in the drilling operations in this district effected a saving of $208 for the year as a result of his interest in the safety movement, and in efficient operations. Roughly speaking, then, each worker through his participation in the safety program enabled the company to show a saving amounting to one month's salary at the end of the year. In order to show that this example is representative, rather than particularly selected for this purpose, it may be pointed out that two disabling accidents did occur during the year. One resulted in a few days' loss of time; whereas the other case, a fractured skull, occurred last June, and the injured employee has not yet returned to work. Incidentally, no accident in that particular area has occurred for 296 days (as of April 1, 1940). At the risk of appearing very cold blooded—which I assure you I am not, because I know personally the men who were injured—I wish to repeat that there is money to be made from safety work and that, as businessmen, we shall do well to investigate the benefits to be derived from establishing an organized safety program or re-emphasizing our interest in this important phase of operations.

Safety Equipment Good Investment

Many of you may feel that there is much more money spent in the promotion of safety than is indicated by budget allotments to a safety department. I will admit that a few dollars extra must be spent for goggles, gas masks, and other safety appliances; but if we will view these expenditures as necessary to good operations, then they might be carried as regular equipment, and need not be charged to a safety department's budget. By the same token, chain guards have come to be considered as a part of a drilling rig, and few of us would think it advisable to discard them. Emphasizing the function of a safety device is often only a relative matter. For example, a blowout preventer may be considered as a safety device to protect men's lives, or simply as a good business investment to save well equipment and oil. In the final analysis, it does both. This illustrates the general tendencies in the past to regard a safety program as being designed entirely to prevent personal injuries, whereas a well-rounded safety program also protects property and the investment involved. Thus, if additional expenditures cannot be justified practically from the point of view of preventing personal injuries, they can be justified frequently as a means of protecting company investment. It has been my experience that every effort to improve efficiency brings about safety as a by-product. Therefore, I suggest that we change our point of view, and recognize that safety to men is a by-product of efficient operations. The oil industry has never been reluctant to install up-to-date equipment and to take advantage of technological improvements. When these improvements are made, with due consideration given to safety factors, then it is evident that it is good business to adopt them and be rewarded doubly for the expense. To use a simple illustration, we all will admit that it is false economy not to keep the brakes on our automobiles in good condition. If we are interested solely in protecting our cars against damage, then all is well and good because, as a by-product, we are preventing personal injury to ourselves and others.

Employee Safety Meetings

There is another safety activity that might be considered costly. I speak of safety meetings for em-

ployees. Whether or not these meetings are held on company time, releasing the men from their duties in order to attend, or whether employees are invited to attend on their own time, are factors which enter into the problem. The frequency and duration of these meetings also may enter into the consideration of costs. I suggest that we consider the results that may be obtained from such discussions, rather than the direct cost of holding the meetings. In many companies the term "safety meetings" is now a misnomer because of the variety of subjects that are discussed. Not only do problems of accident prevention come before the groups for consideration, but many other operating practices are studied. I feel that the mere assembling of employees from time to time is well worthwhile because of the morale-building results that come from the promotion of fellowship, the mutual interest developed in common problems, and the feeling of participation which comes from discussing and suggesting the best methods for carrying on the work.

To illustrate the value of meetings, I cite an outstanding example. In a large unit of a certain company safety work for many years was limited to inspection of equipment by the group of safety engineers. The frequency of accidents was unnecessarily high. A critical analysis of the causes of accidents, through the medium of general meetings with employees, was made. Cutting the inspirational and evangelistic type of appeal to a minimum, the groups of employees soon were able to participate in discussions and get down to the business of accident prevention. Within nine months the frequency was cut one-half. The executive group in charge of that unit agreed that the improvement in experience was due entirely to making meetings the most important part of the safety program.

When considering the cost of anything, there are two views that may be taken: 1, what return can I get from my investment; 2, can I afford not to spend such and such an amount. I have demonstrated by a previous example the direct profit that can be made from actually investing a certain amount of money. Adding to that the intangible profits, or considering the hidden costs of accidents, I am led to believe that we cannot afford to reduce our expenditures for accident prevention. You perhaps have heard repeatedly that the hidden costs of accidents are at least four times greater than the direct costs which may be covered by insurance. Although the latter are insurable risks, the former cannot be covered by insurance policies. May I mention some factors which make up the indirect costs of accidents, taken from a study by H. W. Heinrich, safety engineer for the Travelers Insurance Company:

1. Cost of lost time of other employees who stop work out of curiosity; out of sympathy; to assist the injured employee.
2. Cost of time lost by supervisors investigating the cause of the accident, and rearranging the work.
3. Cost of damage to machinery, tools, and materials.
4. Cost due to interference with or delay of operations.
5. Cost of period of rehabilitation.

A study of this list should indicate the need for doing more than merely carrying workmen's compensation insurance. It should point out to all of us other money savings that can be effected through greater accident-prevention effort.

Employee Training

I have refrained deliberately from discussing the promotion of safety in any particular phase of drilling activity. You, gentlemen, are better acquainted than I with the hazards attending the drilling of oil wells. We could discuss at length the dangers of the use of spinning lines, of the cathead in general, dangers of gas and fire, possibilities of slipping and falling, and the apparently constant possibility of injury from falling equipment. In view of the negligible number of accidents due to equipment failures resulting when equipment is maintained properly, it logically follows that the biggest problem is the prevention of human failures. This implies the training of men in efficient methods of work. Whether a company is large or small, and whether it can afford to maintain a safety department to assist in this work, it is reasonable to assume that the superintendent, toolpusher, and driller are in a position to instruct their men in this phase of drilling. I have in mind a small drilling company whose compensation-insurance premium was reduced materially because of its favorable accident experience, which was brought about by the effort of the owner and his small supervisory staff.

Equipment and its Maintenance

Any well-rounded safety program should include a number of time-tested features which have proved successful. With respect to equipment, safety should begin with its purchase. Manufacturers are becoming increasingly familiar with the safety requirements of our industry, and today many of them are providing safeguards as optional features. It is my personal feeling that safeguards should not be optional, but definitely should be a part of the equipment, and sold as such. A committee of the American Petroleum Institute's Department of Accident Prevention, of which committee I happen to be the chairman, has made a recommendation to this effect. Engineering standards and standard practices for the installation of equipment should be established. Perhaps the most obvious, and at the same time the most neglected, safety procedure is the adequate and proper maintenance of equipment, including tools. Frequent inspections should be made for the purpose of discovering physical hazards and unsafe operating practices. A program of safety meetings is desirable for the dual purpose of promoting the safety

education of individual employees and receiving the benefits of the employees' ideas and suggestions. As a result of these efforts, practical and acceptable safety rules and safe practices can be developed. These should be compiled and issued in some manner that will make them readily available to everyone. If at all possible, a first-aid training program should be included, particularly for operations carried on in outlying districts. Such a program may be carried out at little or no cost through the cooperation of the Federal Bureau of Mines, American Red Cross, and local groups equipped to provide first-aid training. From my own personal experience as a professional safety engineer, for more years than I care to recall, I feel that I can make no more important contribution to this meeting than to emphasize that none of these devices will give results unless it is promoted sincerely and wholeheartedly—and, equally important, unless it is actually put into practice and followed through, and has the wholehearted support of the higher executives.

Conclusion

In conclusion, let me point out that the National Safety Council, American Petroleum Institute, and other agencies are capable and willing to render service to anyone interested in the prevention of accidents by making suggestions, by fostering exchange of ideas through conferences of this type, by the issuance of bulletins that might be of assistance and, in general, by serving as clearing houses for information. Let us never lose sight of the fact that the promotion of safety, whether on drilling rigs, elsewhere in the oil industry, at home, or on the highway, is simply good business.

Developments in California Oil Industry

Synopsis A. I. M. M. E. Review

By V. H. Wilhelm
Member A.I.M.M.E.

Drilling activity in California during 1939 decreased approximately fifteen per cent from that of the previous year. New reserve discoveries were the lowest in many years, but extensions, development of deeper sands, and reappraisals, indicated enough new potential to more than equal 1939 withdrawals of about 223,644,000 barrels.

On June 1st a new uniform method of allocation was adopted, which had the immediate effect of reducing production, so that approximately 6,000,000 barrels of crude were withdrawn from storage during the year. Market demand averaged 628,845 barrels per day as compared with a daily production of 612,945 barrels.

A fairly slow rate of drilling prevailed during the first five months due to the unfavorable storage situation. Subsequent to the adoption of the new uniform method of allocation on June 1, drilling was speeded up and continued at a rapid rate throughout the balance of the year.

As a result of prospecting, four new fields were discovered and seven fields were measurably extended. All of the new discoveries were made in the San Joaquin Valley.

New Discoveries

Coalinga-Northeast: The Amerada Petroleum Corporation discovered a second Eocene shoreline field north of the Coalinga Nose when it brought in well number S.P.L. 7-17 in Section 17-19-16, flowing 4,230 barrels of 32.4° gravity oil and 14,200,000 cubic feet of gas at a depth of 8,237 feet, from the Gatchell sand of Eocene age. This field, located two miles north of the Coalinga Nose Field, is considered to be a separate structure because it has a gas cap and a lower water table. The structure is a broad gentle anticlinal nose separated from the southerly Coalinga Nose Field by a shallow syncline. Production is sealed up dip by the pinching out of oil sands. The average sand thickness is approximately 200 feet, the top 75 feet containing mainly gas. The sand has an average permeability of 1,000 millidarcys and an average porosity of 25 per cent. The productive area of the field is estimated to be between 1,200 and 1,500 acres.

Mountain View Field (South)

The discovery of this field was the result of the combined operations of the following companies: Standard, Superior, and The Texas Company. It

CALIFORNIA OIL FIELD DEVELOPMENT TABLE

Year (est.)	Drilling Notices Filed	Drilling Wells Abandoned	Producers Abandoned	Number Producers Completed (New Wells)	Per Cent Increase or *Decrease	Initial Production of New Wells Daily Average Per Well	Total
1929	1,256	314	212	910	....	1,437	1,307,496
1930	918	254	320	755	*17	775	584,521
1931	329	238	177	246	*67	1,481	364,434
1932	279	191	172	184	*25	852	156,823
1933	596	163	215	248	35	1,105	274,104
1934	631	247	200	449	81	1,190	534,508
1935	986	347	203	710	37	954	677,320
1936	1,102	320	208	786	11	471	370,227
1937	1,643	313	273	1,156	47	560	647,331
1938	1,162	265	252	994	*14	1,242	1,234,482
1939	1,085	254	282	839	*15	1,322	1,108,800

is located two miles south of the main Mountain View Field along the Mountain View Fault. The discovery well, Standard Oil Company's Jewett No. 1, was brought in flowing 2,875 barrels of 37.1° gravity oil and 900,000 cubic feet of gas from the Chanac formation of Pliocene age. The structure is monoclinal, sealed by the main Mountain View fault on the east and cross faulting on the north. The estimated productive area of the field is 120 acres, having an average net sand thickness of 60 feet. This sand has a permeability of 500 millidarcys and a porosity of 24 per cent.

Paloma Field

The Paloma Field, which is located fourteen miles southwest of Bakersfield, was discovered by the Western Gulf Oil Company, in partnership with The Texas Company. Geophysical exploration was responsible for outlining the area prospected. The discovery well, Western Gulf-Texas' K.C.L. No. 1, located in the center of Section 3, 32-S, 26-E, was brought in for 2,200 barrels of 55.5° gravity oil and 15,000,000 cubic feet of gas. The well is producing from 122 feet of net sand which has an average porosity of 20 per cent and an average permeability of 135 millidarcys. The top portion of this sand body is predominately a gas sand of very low permeability. Only the upper portion of the Stevens zone (Miocene) has been penetrated in this well and undoubtedly later completions will cut off gas sands and produce oil with a low gas/oil ratio from the lower Stevens zone, as is done in the adjacent Coles Levee Field. There is considerable uncertainty as to the type of structure and the productive area. This field is on the extension of the Elk Hills uplift or on an echelon fold.

Strand Field

One mile northeast of the Canal Field the Tide Water Associated Oil Company, in conjunction with the Continental Oil Company, discovered the Strand Field when the Tide Water Associated Oil Company brought in K.C.L. 35-E flowing 1,306 barrels of 34.1° gravity oil from the Stevens zone(Miocene) with bottom of hole at 8,320 feet. The field has a closure of 100 feet with an estimated productive area of 300 acres. The net average thickness of productive sand is 60 feet, its average porosity being 22 per cent and permeability 330 millidarcys.

Extensions and Deeper Sand Developments San Joaquin Valley District

Coalinga Nose Field: This field, which was the most important discovery of 1938, was subjected to an intensive drilling campaign during the year 1939. Development indicates that between 2,500 and 3,000 acres will be productive, with an average sand thickness of 370 feet.

Coles Levee and Richfield Western Fields

The Coles Levee Field and the Richfield Western Field (Tupman), which were discovered in November, 1938, have been rapidly developed during the year. Further development will be needed before it can be ascertained whether these two fields, which are contiguous, are on the same structure. Production is obtained in both fields from overlapping beds in the upper Miocene, on the east plunging nose of Elk Hills. At the present time the Coles Levee Field has an indicated productive area of 2,400 acres and the Richfield Western Field, 700 acres. The ultimate productive area, if these two fields are on the same structure, will probably be in excess of 5,000 acres.

Wasco Field

The productive area of this deep field was increased to approximately 450 acres by the completion of George F. Getty's Janssen No. 1 on the north end of the field at a depth in excess of 13,000 feet, with only 32 feet of net productive sand.

Coastal District

The most important development in this district during the year was the extension of the Ventura Avenue Field, both to the north and to the east, at depths ranging between 8,000 and 11,000 feet. This field has the greatest sand thickness of any field in California, its 3,000 feet of sand exceeding the Long Beach Field with its maximum thickness of 2,240 feet.

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Los Angeles Basin District

Montebello Field (West): More than a hundred wells have been completed in this field during the year. Development indicates a productive area of about 600 acres. The Eighth, or deepest zone, which has had its greatest development during the year, has 100 feet net thickness of sand. A gas cap occupies the higher structural portions of this field. As there is very little evidence of edge water encroachment, this gas cap has expanded very rapidly over the entire area of the field. In order to prevent underground and surface waste of gas, its production has been controlled by a court order under provisions of the California Gas Conservation Law. A formula has been used in curtailment of gas which gives approximately equal withdrawal of reservoir volume to all wells. At the present time, under this formula, oil production of the field is less than that allotted by the Oil Umpire.

Wilmington Field

This field had more well completions during the year than any other field in the State. Development of the tideland reserves by slant drilling has been very successful, and results indicate that this type of drilling may continue over a number of years. The present productive area embraces approximately 4,400 acres with an average sand thickness of 490 feet, and is believed to contain, at present, the largest oil reserves of any field in the Los Angeles Basin and ranks about third on the basis of ultimate production.

Conclusion

The former need for increased reserves is now over-shadowed by more necessary demand for present profits. Under the present system of curtailment, with the tendency of greater curtailment of large wells, giving less weight to potentials, reserves of oil in flush fields will have less present value because of the lesser rate of withdrawal and greater deferment of revenue.

You are reading the Pacific Coast oil men's home paper.

Eastman Offers Type-M Drift Indicator

To eliminate the developing of photographic drift indicator records in solutions, the Eastman Oil Well Survey Co. of Long Beach, Calif. and Dallas, Texas, is manufacturing for distribution a new Type-M drift indicator which is radically different in design. It records on light-sensitive paper that can be loaded and unloaded in daylight. The instrument is small and compact and can be handled easily and quickly.

The mechanism incorporates an arrangement whereby the inclination of the well is recorded by a strong light beam directed through the plumb-bob onto the light-sensitive paper printed with concentric circles, each of which represents a degree.

The instrument is run into the well, in a new Eastman streamlined barrel, on piano wire, sandline or dropped to bottom just before drill pipe is pulled to change bits. The barrels are supplied with interchangeable connections for all operations and small enough to run through tool joints in 3½" Regular API Drill Pipe.

Although not photographic in principle, the new Type-M Drift Indicator embodies the important advantage of the photographic method of recording. This drift indicator furnishes a positive reading when the instrument is on bottom and quiet. If moving, a blurred or blank record will be the result and erroneous data can be detected, saving much lost time caused by misleading readings.

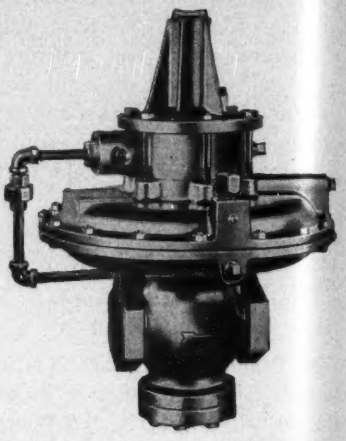
The drift angle off vertical only, is available with the new Type-M Drift Indicator. Directional drift angle surveys are available with Eastman Single Shot and Multiple Shot Survey Instruments.

Full description, information and instructions of operation are available.

Emco Introduces New Pressure Regulator

Regulators developed in the past for gas pressure control have been largely designed to meet some specialized installation. Examples of these are appliance regulators for use in controlling the pressures on gas burning appliances and service regulators for reducing high distribution pressures to lower, safe house line pressure. There is an increasingly large field of control problems not met by this type of specialized equipment. To meet these needs, the Pittsburgh Equitable Meter Co. has rounded out its line of control equipment with the EMCO "1001" Regulator. It is claimed by the manufacturer, as the name implies, to have a "thousand and one" types of application. It is also stated that through the use of this regulator, it is now possible to control pressure with a high degree of accuracy for any outlet setting of from 2 ounces up to 20 pounds, having rates of flow well in excess of the capacities normally transmitted through 2 inch piping.

The manufacturer states that the excellent performance of this regulator is obtained by employing a method of diaphragm loading, not previously available on medium and small size regulators. Regulators of conventional design use a spring or weights to oppose the controlling pressure which actuates the operating diaphragm. In the design of the EMCO "1001" Regulator a pilot loading system for diaphragm control is incorporated which, it is said, assures the movement of the main operating diaphragm with the slightest change in the control pressure. It is claimed that this principle of control assures the maintenance of the desired pressure at a definite and unvarying amount from minimum flow rates to the maximum capacities which can be obtained under the existing pressure conditions, and that the lock-up characteristics are exceptional.



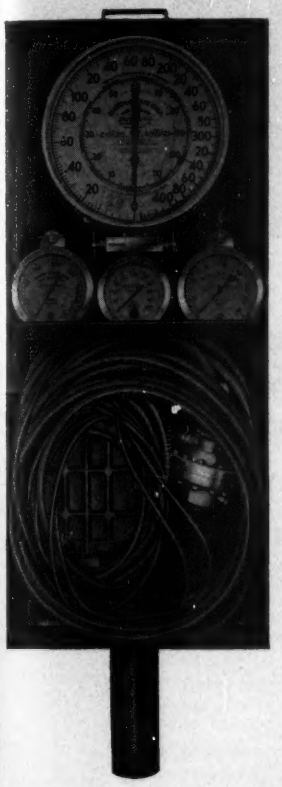
This regulator is designed to provide accurate control for installations having both small and large flow rates, where supply pressures ranging up to 150 pounds must be reduced to 20 pounds or less. In this category are large gas appliances, boiler plants and industrial heat treating furnaces. The EMCO "1001" Regulator is also well suited to small town border station requirements and may also be employed for district regulator installations where systems are operated at intermediate pressures or at intermediate and low pressure combined.

The Pittsburgh Equitable Meter Co., manufacturers of the EMCO "1001" Regulator, has prepared a comprehensive bulletin, making use of four-color sectional diagrams to illustrate the operating principle. This bulletin, No. 1059, will be sent to those interested by addressing a request to the manufacturer at 400 North Lexington Ave., Pittsburgh.

Hearings on S. Res. 245, proposing an investigation of the oil and natural gas industries, will be postponed until court action on the Columbia Gas and Electric case, the Senate Judiciary Committee agreed on April 22.

"Sealtite" Drilling Control Eliminates Fluid Leaks

A new drilling control instrument, especially built to eliminate fluid leakage, has been introduced by Martin-Decker Corp., Long Beach, Calif. The instrument, known as the "Sealtite" Drilling Control, is assembled with steel-shielded rubber hose and steel fittings instead of



the conventional copper valve and tubing, making it leak-proof and pressure-tight throughout. The entire fluid system is filled, tested, and sealed at the factory. No further pumping up is required. Inasmuch as the instrument is connected up and ready to install when it reaches the rig, installation time is materially reduced.

The complete instrument consists of five individual units—a "Sealtite" Weight Indicator with super-sensitive vernier mechanism, "Sealtite" Mud Pump Gauge, Torque Gauge, Tachometer and Recorder. Variations in weight on bit, mud pump pressure, and torque are permanently charted by the Recorder, which is mounted back-to-back with the Weight Indicator. This provides ample storage space in the front of the case for the rubber hose and diaphragms during transportation.

The "Sealtite" Weight Indicator has unusually large capacity, sufficient for handling 20,000 foot wells—deeper than any so far drilled. It is indirectly illuminated for easy night reading, and indicates weight directly in thousands of pounds, or points, on a 16-inch dial face. The vernier gauge hand is used for light-weight operations where extremely accurate readings are required.

The Mud Pump Gauge, Torque Gauge and Tachometer are equipped with new M-D flexo-glass lenses that are shock- and pressure-proof. The Pump pressure and Torque mechanisms operate in a bath of oil. Pump pressure readings range up to 5000 pounds, while capacities of the Torque Gauge and Tachometer are 350 pounds and 500 RPM, respectively. Wherever required, special pulsation dampers are used to smooth out the gauge readings and insure accuracy and sensitivity in rough drilling.

Complete information on the "Sealtite" Drilling Control Instrument can be obtained by writing direct to Martin-Decker Corp., Long Beach, Calif.

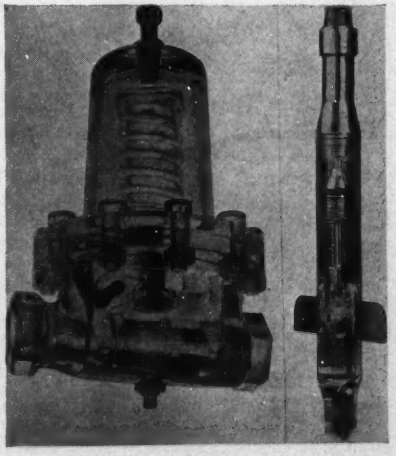
Transparent Models Aid Equipment Sales

An innovation in effective selling tools is the use of transparent plastic models which permit the customer or prospect to see for himself the inside workings of equipment or devices wherein the vital parts or important sales features are normally concealed. According to the Dave Swedlow Corp. of Glendale, Calif., pioneer fabricators of models and other products made of transparent "Lucite" (the new DuPont plastic) and Plexiglas, research and experiment have advanced the art of working with transparent plastics to the point where it is now possible to make transparent working models of practically any tool or device, regardless of size, type or construction.

While the basic plastic material used has limitations as to form and size, it is understood that the Dave Swedlow Corp. has developed fabricating methods which have widely extended the practical applications possible with this remarkable material.

The valve shown in the accompanying illustration is an example of the rather complex type of units it is possible to fabricate of Lucite and Plexiglas. This remarkable piece of work, which is an exact scale model of an A. W. Cash Co. streamlined (Type 1000) Pressure Reducing Valve, is ten inches high and yet weighs only four pounds. It is constructed entirely of transparent plastic even to the spring which is sufficiently flexible to be compressed to illustrate its action.

The Swedlow Corp. advise that the inherent properties of Lucite and Plexiglas lend themselves particularly well to model work or to fabrication of any unit or device where transparency is vital or advantageous.



Left: Transparent Lucite Pressure Reducing Valve. Right: Wall Scraper Model with body made of Transparent Lucite.

Lucite and Plexiglas are both strong and tough, yet light in weight. They are clear (clearer than optical glass) and possess a remarkable white brilliance free from any yellow haze or cast. In addition, the surface of these materials will not easily chip. Lucite and Plexiglas are available in a wide range of colors, which are also transparent and yet brilliant in tone. Another important factor in the construction of models, either stationary or working, is that when the functioning of a part is dependent upon the material of which it is made, such as a rubber seal, bronze thrust ring or steel valve spring, the actual material can be used, as Lucite or Plexiglas are unaffected by and do not affect other substances, say the manufacturers.

Manufacturers who have used transparent plastic models for sales or display purposes are reported to be enthusiastic about the results, claiming that many of their customers say they see and really understand the important inner workings of their equipment for the first time . . . and it is thus that a new selling force is created.

The Dave Swedlow Corp. has appointed the Transparent Plastics Products Co., 428 Boyd St., Los Angeles, Calif., as their exclusive industrial sales representatives. It is understood that the latter organization will operate on a national scale and will shortly appoint sales representatives in all important key industrial centers.

Glass House Features G-E Exhibit at S. F. Fair

A "phantom house" built of plate glass heads the spectacular features listed for the new $250,000 General Electric exhibit in preparation for the 1940 Golden Gate International Exposition.

Robert L. Smallman, who has just been named manager of the exhibit, lists the features scheduled as follows:

The "Phantom House," a full-size five-room model of ultramodern design, with outside and inside walls of transparent glass, beautifully decorated and electrically equipped throughout. A bevy of beautiful hostesses will conduct visitors through the glass house.

The largest light in the world, 50,000 watts, lighted at regular intervals for first time in the West.

New production of the "House of Magic," half-hour scientific stage show with latest developments from the General Electric research laboratories.

Broadcasting under glass from a new "fish-bowl" studio at KGEI, international broadcasting station transmitting Exposition programs to Latin America, Asia, the Antipodes and South America.

Animated "light-conditioning" display, contrasting old and modern home lighting methods.

Replica of Edison's laboratory, with old-fashioned glass blower making the first electric lamps just as Edison did.

A "Magic Kitchen," which "talks and walks."

"There will be something doing every minute at the new General Electric exhibit, with two or more 'live shows' running at all times the exhibit palaces are open," Mr. Smallman said.

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Interstate Commerce Commission has prescribed rules covering transportation of inflammable liquids by common and contract carriers effective June 15, 1940, and has prescribed specifications for tank trucks used in hauling gasoline, liquefied petroleum gases, and other inflammable liquids.

You are reading the Pacific Coast oil men's home paper.

MAPS

Large maps of Los Angeles Basin oil fields and map showing all California oil fields. Price $15.00 each on paper and $20 each on cloth. Individual state oil and gas maps of Mid-Continent and Rocky Mountain regions. Maps show geological cross sections at base. These maps indicate wells drilling, wells producing and abandoned, with depths.
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Oil Men's Calendar

C.N.G.A. Meeting First Thurs. Each Month.

May

27-31—American Petroleum Institute, 10th Mid-Year Meeting, Blackstone & Texas Hotels, Fort Worth, Tex.

June

9-14—Society of Automotive Engineers, Summer Meeting, The Greenbriar, White Sulphur Springs, W. Va.

17-20—American Society of Mechanical Engineers, Milwaukee, Wisc.

24-28—American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

A. S. M. E. Honor For G. L. Kothny

For distinct engineering attainment and long practice in his profession, G. L. Kothny, vice-president of the Sperry-Sun Well Surveying Co., has been honored by the bestowal of a friendship in the American Society of Mechanical Engineers.

Necessary for the fellowship are the attainments mentioned and 25 years in the practice of engineering. Mr. Kothny became a Junior member of the society in 1905, and leaving that membership division, was elected a member in 1912.

Mr. Kothny, who is known for various inventions and developments, in 1920 was a recipient of the Edward Longstreth Medal of Merit for the invention of the Radojet Air Pump.

California Crude Oil Production

Two Weeks Ended May 11, 1940

	May Daily Quota	Average Daily Production	Excess
San Joaquin Valley			
Belridge—North	11,770	10,969	*801
Belridge—South	2,134	1,990	*144
Buena Vista	16,358	16,319	*39
Canal	5,785	5,958	173
Coalinga-E. (Eocene)	15,414	14,730	*684
Coalinga—East-West	15,226	10 104	*5,122
Cole's Levee	4,989	5,751	762
Edison	2,198	2,408	210
Elk Hills	6,911	12,776	5,865
Fruitvale	5,700	5,465	*235
Greeley	3,709	2,862	*847
Kern Front	7,207	6,415	*792
Kern River	6,793	3,956	*2,837
Kettleman No. Dome	35,062	44,150	9,088
Lost Hills	3,926	3,810	*116
McKittrick	3,747	3,354	*393
Midway	36,960	38,403	1,443
Mount Poso	9,303	9,436	133
Mountain View	8,081	8,875	794
Rio Bravo	8,352	7,702	*650
Round Mt. and Coffee Canyon	7,008	7,188	180
Ten Section	9,070	9,039	*31
Wasco	1,745	1,914	169
Other Fields	3,607	3,380	*227
TOTAL	231,055	236,924	5,869
Coastal Counties			
Elwood	3,546	3,643	97
Rincon	2,626	4,069	1,443
Santa Maria	6,015	3,055	*2,960
Gato Ridge	2,226	868	*1,358
Santa Maria Valley	17,624	17,425	*199
Santa Paula-Newhall	5,726	6,379	653
Ventura Avenue	31,910	34,332	2,422
Other Fields	5,332	5,507	175
TOTAL	75,005	75,278	273
Los Angeles Basin			
Alamitos-Seal Beach	7,175	7,380	205
Brea-Olinda	7,955	5,757	*2,198
Coyote—East	3,505	3,704	199
Coyote—West	10,058	5,977	*4,081
Dominguez	17,338	21,315	3,977
El Segundo	2,226	2,328	102
Huntington Beach—New and Old	22,741	24,454	1,713
Inglewood	12,201	12,715	514
Long Beach	38,984	45,533	6,549
Montebello	5,907	5,075	*832
Montebello-West End	18,647	16,546	*2,101
Playa del Rey	3,895	4,192	297
Richfield	7,043	8,263	1,220
Rosecrans-Athens	7,987	9,817	1,830
Santa Fe Springs	23,793	26,150	2,357
Torrance	5,117	5,022	*95
Torrance "34" and "D & B"	6,097	6,639	543
Wilmington	78,894	83,748	4,854
Other Fields	3,980	5,320	1,340
TOTAL	283,543	299,935	16,392
STATE TOTAL	589,603	612,137	22,534

*—Shortage.